

**SPECIALIZED HEALTH CARE AND
MEDICAL EDUCATION
DEPARTMENT**

GOVERNMENT OF THE PUNJAB



Health Department

**PRODUCT VOCABULARY MEDICAL
STORE (PVMS) OF HOSPITAL
ALLIED SERVICES AND
MACHINERY**

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APPROVED PVMS

PVMS OF MEDICAL EQUIPMENT	
Clinical Specialty	Allied Equipment and Machinery
Generic Name	CENTRAL STERILE SUPPLY DEPARTMENT (CSSD)
Clinical Purpose	To establish and maintain sterile processing and distribution standards and to provide supplies of sterile linen packs, basin, instruments and other sterile items.
TECHNICAL SPECIFICATIONS	
<p>NOTE: The given below is the designed turnkey solution of complete hospital, in case of requirement of complete new system, procuring agency need to define the items required and quantities of each items as per the bed strength of hospital.</p> <p>In case of requirement of any of the given below equipment, with in the running/equipped hospital, Procuring agency may select the required items and define the quantities as per its actual requirement.</p> <p>CLEANING & WASHING UNIT Cleaning & washing unit, Approx. 2000 x 700 x 900 mm (WxDxH) , consisting of Stainless Steel square meter Table Top 40-50 mm backsplash ,made of Ni-chrome steel/SS sheet.</p> <p>01/ 02 No's(procuring agency to specify)Sinks each approx. 500x500x250 mm made of stainless steel with the provision of counter top; equipped with drain valve and stand pipe and with siphon trap.</p> <p>Substructure cabinets with shelve. Cabinet is in-chrome steel/SS design.</p> <p>01/02 No's(procuring agency to specify) of integrated Spray Guns for dematerialized water/ air with 08 cleaning nozzles, hose, table lead through</p> <p>Space to hose the 01/02-ultrasonic cleaners (procuring agency to specify).</p> <p>WASHING /DISINFECTION / DRYING UNIT Microprocessor controlled automatic powered vertical down sliding two glass doors type. Washing chamber, washing arms, preheating tanks and water filters made of high quality stainless steel AISI 316 L., Light inside of chamber, Frame made of stainless steel AISI 304</p> <p>Touch screen/panel display on loading and display on unloading side with integrated printer. External steam heated for Automatic rinsing, washing, disinfecting and drying including integrated electric element as backup heating. Capable of washing internal and external surface of items such as instruments, glassware, tubing, syringes, hollow wares etc. Stainless Steel construction. Floor model chamber size 15-18 DIN basket Capacity. 2 dosing pumps of chemical products complete with flow meters and sensor. 8-10 standard pre-set cycle programs, 5 service programs and Fast/short cycle disinfection program (around 30 min).</p> <p>The unit should be complete with baskets, trays, and stands for washing /disinfection of the items mentioned above. The unit should have complete exhaust air condenser for outgoing air with condensate drain. Operation 380-400V.</p>	

ACCESSORIES

- A.N Wash Cart including tubes-7sets
- OP Cart for 36/45 trays of instruments
- MIS/Lap instruments cart
- Instrument trays for OP Cart
- Rack for 25 shoes
- Wash cart for Instrument containers
- Transfer trolleys for cart.

HEAVY DUTY STEAM STERILIZER

High pressure Steam Sterilizer each with external steam supply as primary source with integrated steam generator as backup.

Fully automatic, programmable, microprocessor type. Touch screen colored display and integrated printer. Automatic motorized/pneumatic two doors pass through system. Time cycled, working pressure 32 psi. Safety interlock. Temperature & Pressure recorder. Chamber pressure indicator. Cycle indicator to determine the phase of sterilization cycle. Program/Cycle selection.

Complete with standard accessories and removable shelves, capable of taking both packets and containers of all standard sizes. Chamber capacity 12 STU, rectangular shape. Chamber, jacket and doors made of AISI 316 L/Ti. The system complete with built-in water saving system, automatic heat exchanger and Air detector. Two loading / unloading trolleys and two loading carts compatible with system.

UPS of suitable capacity with minimum 15 minutes for Controller cum display for monitoring and controlling of parameters during power shedding provided/ installed by the manufacturer.

MEDIUM STEAM STERILIZER

High pressure Steam Sterilizer each with external steam supply as primary source with integrated steam generator as backup.

Fully automatic, programmable, microprocessor type. Touch screen colored display and integrated printer. Automatic motorized/pneumatic two doors pass through system. Time cycled, working pressure 32 psi. Safety interlock. Temperature & Pressure recorder. Chamber pressure indicator. Cycle indicator to determine the phase of sterilization cycle. Program/Cycle selection.

Complete with standard accessories and removable shelves, capable of taking both packets and containers of all standard sizes. Chamber capacity 04 STU, rectangular shape. Chamber, jacket and doors made of AISI 316 L/Ti. The system complete with built-in water saving system, automatic heat exchanger and Air detector. Two loading / unloading trolleys and one loading carts compatible with system.

UPS of suitable capacity with minimum 15 minutes for Controller cum display for monitoring and controlling of parameters during power shedding provided/ installed by the manufacturer.

REVERSE OSMOSIS SYSTEM

RO system should be compatible with the CSSD equipment requirement and in accordance with the quality of the local water where it is being installed. It should have imported parts that may be locally assembled.

ETHYLENE-OXIDE (EO)"

Ethylene-Oxide (EO) gas sterilizer. Single door. Temperature and pressure recorder. Complete

with baskets and cartridges/Cylinders for at least 250 cycles. Chamber capacity 100-150 liters minimum the unit should be complete with aeration system and should include all safety interlock, complete with built-in safety feature according to international accepted standards.

FORMALDEHYDE STERILIZER (FO)

Formaldehyde Sterilizer (FO) gas sterilizer. Temperature and pressure recorder. Complete with baskets and cartridges/Cylinders for at least 250 cycles. Chamber capacity 60-70 Liter / 100-150 liters (Procuring agency to specify) minimum the unit should be complete with aeration system and should include all safety interlock, complete with built-in safety feature according to international accepted standards.

PLASMASTERILIZER

Chamber capacity : 60-70 Liter or 100 - 110 liter (Procuring agency to specify)

Microprocessor controlled. Chamber should be made of AISI 316L / TI

System should have integrated thermal printer and compatible UPS, Complete with baskets, the unit should include all safety interlock, complete with built-in safety feature according to international accepted standards

NOTE: Procuring agency to define the requirement of low temperature sterilization out of EO/FO/Hydrogen Peroxide.

TABLE TOP STERILIZER

Chamber Volume: 19 Liters or better

Microprocessor Controlled with digital display unit Class-B type sterilizer

Different type of programs Temperature range 134oC

Temperature and pressure recorder and printer

OIL FREE AIR COMPRESSOR

Compressor oil free, Noiseless, single stage, two cylinders with electric motor, pressure 8-10 bar, Capacity 175 Liter. OR as per same manufacturer recommendations.

ULTRASONIC CLEANER

Ultrasonic cleaner integrated type, cleaning chamber constructed of corrosive resistant 304 SS. Heating thermostatically controlled. Digital display of time and temperature. Tank Capacity 21-25 Liter. System complete with basket, LID and other standard accessories. Operation 220V, 50 Hz.

TRANSPORT AND DISTRIBUTION TROLLEY

Distribution trolley, 03 shelves made of stainless steel, size 700x500x800mm³. (WxDxH)

PAPER DISPENSING TROLLEY

Movable paper dispenser trolley made of stainless steel for storing of sterilization paper sheets at packing tables. 04 frames for paper sheet of 1200mm and one bottom shelf. Mobile with two lockable wheels.

PAPER SEALING MACHINE

Microprocessor controlled automatic heat sealer for sterilization bags and pouches. Stainless steel body with printing mechanism. Adjustable temperature up to 200 degree Centigrade, Speed approx. 10m/min.

CUTTING DEVICE

For storage and preparation of paper/Plastic bags in rolls. The cutting knife is made of tempered stainless steel and is self-grinding, Size 700-1000mm.

TAPE DISPENSER

Tape dispenser for autoclave tape. Main parts of the dispenser are made of metal. Design for two roll of tape.

BASKET TROLLEY

Basket Trolley made of stainless steel for storage/transport of baskets. Size approx. 600x1500x450mm.

FREE STANDING BASKETS RACK

Free standing basket storage rack 04 single sections. Size approx. 1500x400x1800mm.

PACKING TABLE

Table top of Stainless Steel with one or two drawers, Stand of stainless steel including two top mounted shelves and Illuminated Magnifier.
Dimensions approx. 1600 X 800 X 800 mm.

LINEN TABLE

Inspection and folding for linen, the table top will be made of Stainless Steel top with inspection window. The frame is made of stainless steel. Approx. Dimensions (1600 X 800 X 900 mm).

MODULAR WIRE BASKET

Modular wire Basket made of stainless steel for disinfections, loading/unloading equipment, Sterilizers as well as storage racks and distribution trolley. Pile able when loaded /stackable. Compatible with Instruments/utensils of the system. Size approx. (580 X 390 X190 mm) acceptable up to the tolerance of +10% in size.

CLOSED TRANSPORT TROLLEY

Closed transport trolley made of stainless steel, lockable, Front wheels with directional locks and back wheels with brakes. Size approx. (900 X 650 X 1250 mm).

NOTE: The procuring agency to specify that the required furniture/Trollies for CSSD will be Local / Imported.

SPECIAL TERMS & CONDITIONS IN CASE OF TURN KEY PROJECT:

- The bidders are required to submit the complete drawing in case of turnkey project.
- For CSSD installation; copper/ SS pipes will be used as per standards. The complete flooring of CSSD with PU anti-bacterial sheet, ceramic tiles on walls, dumpa false ceiling will be installed. The partitioning will be made with 2mm Aluminum sheet. Floor cleaning/ polishing machine will be the part of furnishing. Thermo disinfect able shoes sizes 39/40/41/42 (150 pairs).
- The furnishing of all rooms including changing, sorting, sitting, waiting etc will also be done along with chairs and tables etc.
- Computer, Printer, UPS along with table/chair will be provided for record keeping.

Clinical Specialty	Allied Equipment and Machinery
Generic Name	ULTRASONIC AUTO DISINFECTOR
Clinical Purpose	Instrument disinfection
TECHNICAL SPECIFICATIONS	
Unit should have integrated pulsation waveform system Ultrasonic power 400 watt or above Integrated heating device Temperature up to 90 ° C Volume 20 liters or More	

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Clinical Specialty	Allied Equipment and Machinery
Generic Name	ELECTRONIC AUTOCLAVE
Clinical Purpose	Sterilization
TECHNICAL SPECIFICATIONS	
<p>Fully automatic, programmable, microprocessor type. Touch screen colored display and integrated printer. Automatic motorized/pneumatic single door system. Time cycled, working pressure 32 psi. Safety interlock. Temperature & Pressure recorder. Chamber pressure indicator. Cycle indicator to determine the phase of sterilization cycle. Program/Cycle selection. Complete with standard accessories and removable shelves, capable of taking both packets and containers of all standard sizes. Chamber capacity 01 STU, rectangular shape. Chamber, jacket and doors made of AISI 316 L/Ti. The system complete with built-in water saving system, automatic heat exchanger and Air detector.</p> <p>Two loading / unloading trolleys and one loading carts compatible with system.</p> <p>UPS of suitable capacity with minimum 15 minutes for Controller cum display for monitoring and controlling of parameters during power shedding provided/ installed by the manufacturer.</p>	

APPROVED PVMS

APPROVED PVMS

Clinical Specialty	Allied Equipment and Machinery
Generic Name	MEDICAL LAUNDRY PLANT
Clinical Purpose	For the washing purpose of Hospital dirty linen
TECHNICAL SPECIFICATIONS	
<p>NOTE: The given below is the designed turnkey solution of complete hospital, in case of requirement of complete new system, procuring agency need to define the items required and quantities of each items as per the bed strength of hospital.</p> <p>In case of requirement of any of the given below equipment, with in the running/equipped hospital, Procuring agency may select the required items and define the quantities as per its actual requirement.</p> <p>WASHER EXTRACTOR The Washer Extractor shall be steam heating free standing type, fully automatic with front loading/unloading. Fully programmable, microprocessor control. Stainless steel in all vital parts for high degree of rust protection, Stainless steel front panels and powder painted side panels. Liquid connections/ powder compartment.</p> <p>The system should be consisting of following:</p> <ul style="list-style-type: none"> • Capacity/Load: 30-40 Kg/50-60 Kg./ 90-100 Kg (The procuring agency will specify the actual required capacity, the mentioned specifications are in accordance with the 50-60 Kg, in case of any other option selection, all other feature values will be accordingly changed as per manufacturer's standard design) • Drum Volume: 500-600 Lit. • Extraction : 770-800 rpm (Approx.) • Pneumatic/ electronic drain valve • Cycle Time: Max. 45-60 min. • Frequency controlled motor • Oil lubrication of bearing gaskets <p>WASHER EXTRACTOR HYGIENE The Washer Extractor shall be steam heating free standing type, fully automatic with front/back loading/unloading. Fully programmable, microprocessor control. Stainless steel in all vital parts for high degree of rust protection, Stainless steel front panels and powder painted side panels, Multi liquid supply connections/ powder compartment.</p> <p>The system should be consisting of following:</p> <ul style="list-style-type: none"> • Capacity/Load: 30-35 Kg/ 20-25 Kg(The procuring agency will specify the actual required capacity, the mentioned specifications are in accordance with the 30-35 Kg, in case of any other option selection, all other feature values will be accordingly changed as per manufacturer's standard design) • Extraction : 800 rpm (Approx.) • Pneumatic drain valve • Cycle Time: Max. 45-60 min. • Frequency controlled motor • Oil lubrication of bearing gaskets 	

DRYING TUMBLER

Drying Tumbler with steam heating, fully automatic Microprocessor control having stainless steel drum and two full loads per hour. Error codes for easy trouble shooting. Service program for adjustment of parameters, temperature and cool down time. The tumbler to be factory painted with enameled paint and shall have the following specifications:

- Capacity of drying tumbler: 15-20 Kg/20-30 Kg/30-40 Kg/40-50 Kg (The procuring agency will specify the actual capacity required, the mentioned specifications are in accordance with the 30-40 Kg, in case of any other option selection, all other feature values will be accordingly changed as per manufacturer's standard design)
- Drum Volume: 550-650 Lit.
- Cycle Time: 30-40 min. including loading & unloading

FLAT WORK DRYER IRONER

Flat Work Dryer Ironer shall be steam heated, cylindrical type having single roller/cylinder. Automatic speed adjustment. Finger guard protection, Nickel/Chrome-plated cylinder, Front loading and Front return and shall have following minimum specifications:

- Speed: 1-8 m/ min (variable speed)
- Drive: Electrical Motor
- Feeding: Through Belts
- Cylinder Dia: 450 - 500 mm Approximately
- Working Width: 2500 - 3000 mm Approximately
- The Dryer Ironer to be a compact free standing self-contained unit and to be supplied in factory assembled state.

UTILITY PRESS

- Air operated laundry press adjustable squeezing pressure between head and buck.
- Steam heating
- Integrated/ separate air compressor
- Fitted with timer and two hand push buttons
- Water spray gun, condenser and support

HAND IRON (STEAM OPERATED) WITH IRONING TABLE)

Steam heated iron, with mechanical steam valve, steam and return pipes with support, pipes connections set, with cut off valve and thermodynamic trap, iron rest

SEWING MACHINE

Motorized, Heavy duty with sewing machine table

PACKING/SORTING TABLE

The main structure is completely built with tubular profiles in Stainless Steel AISI 304, with plain in plate strengthened and supported in the underlying part.

With 4 plastic feet in the corners.

Dimensions: Length: 1400 mm, Width: 800 mm, Height: 900 mm

DIRTY LINEN COLLECTION TROLLEYS

Made with Aluminum.

Completely closed With upper lid and double front door Upper rim reinforced with light alloy

aluminum sections. Walls completely smooth.

Lower bumper made of light alloy and covered with grey anti-track PVC.

Handle fixed on the wall with swivel wheels. Dim.: 1090 x 690 x 1530 h mm

Mounted on 4 rubber wheels, diam.200 mm (2 fixed and 2 swivels) arranged at the corners.

DIRTY LINEN TROLLEYS FOR WORKING INSIDE DIRTY AREA

Made with Aluminum plate, walls and bottom.

Framework for supporting wheels and bottom reinforcement, in robust extruded section bar of Aluminum. Upper edge reinforced with round profile

Mounted on n.4 rubber wheels diam.200 mm (2 fixed and 2 swivels) arranged at the corners.

Dimensions: LENGHT: 1030 mm, DEEPNESS:630 mm ,HIGHNESS:710 mm

CLEAN LINEN TROLLEYS FOR WORKING INSIDE CLEAN AREA

Made with Aluminum plate, walls and bottom.

Framework for supporting wheels and bottom reinforcement, in robust extruded section bar of Aluminum.

Upper edge reinforced with round profile.

Complete with double removable bottom, perforated for the drainage.

Mounted on n.4 rubber wheels diam.200 mm (2 fixed and 2 swivels) arranged at the corners.

Dimensions: LENGHT: 1030 mm, DEEPNESS:630 mm ,HIGHNESS:710 mm

STORAGE RACKS

Entirely built with Stainless Steel profiles. Electro-polish finishing.

Possibility to insert shelves in Stainless steel wire, adjustable in height each 110 mm. Mounted on 4 rubber wheels diam.125 mm in grey anti mark rubber

Dim: Length: 1400 mm, Width: 800 mm, Height: 900 mm

NOTE: The procuring agency to specify that the required furniture/Trollies for laundry will be Local / Imported.

Clinical Specialty	Allied Equipment and Machinery																						
Generic Name	HIGH PRESSURE BOILER																						
Clinical Purpose	Central steam source for CSSD and hospital laundry.																						
TECHNICAL SPECIFICATIONS																							
<p>HIGH PRESSURE STEAM GENERATOR/ BOILER Fire tube natural gas high pressure boiler, of specification mentioned below. The boiler shall be complete with burner, burner controls, gas train feed water pumps, feed water tank, safeties, explosion doors, automatic controls, piping to the CSSD and Laundry plants and other accessories required to complete the installation and to bring the unit into operational state with following main components;</p>																							
<p>GAS FIRED BOILER</p> <ol style="list-style-type: none"> a. 02/01/0.5 TPH @ 10Bars gas fired boiler (The procuring agency will specify) b. Burner, single/dual fuel (The procuring agency will specify) c. Boiler valves & Control set d. Additional feed water pump e. Chimney, Local (above the hospital building height) f. Boiler Ladder and platform (Local) g. Electrical Control panel h. Insulation, cladding & Painting 																							
<p>FEED WATER TANK (LOCAL MADE)</p> <ol style="list-style-type: none"> a. Capacity 2,000L b. De aerator head, SS c. Valves and controls set d. Insulation, cladding & Painting 																							
<p>PIPING AND ELECTRIFICATION</p> <ol style="list-style-type: none"> a. Pipes & valves b. Instruments and gauges set c. Electrical cables and electrical construction work complete d. Insulation, cladding & Painting on the installed items DETAILED 																							
<p>SPECIFICATIONS</p> <table> <tr> <td>Design Code</td> <td>Class-1 of ASME/BS/JIS/PED</td> </tr> <tr> <td>Boiler Type</td> <td>Natural Gas Fired, 3/ 4 pass, Wet Back Technology</td> </tr> <tr> <td>Configuration</td> <td>Horizontal, Skid mounted Design Pressure 11.5 bars</td> </tr> <tr> <td>Working Pressure</td> <td>10 bars (g)</td> </tr> <tr> <td>Feed Water Temp</td> <td>85 – 90oC</td> </tr> <tr> <td>Steam generation</td> <td>02/01/0.5 TPH @ 10Bars gas fired boiler (The procuring agency will specify)</td> </tr> <tr> <td>Fuel</td> <td>Natural gas</td> </tr> <tr> <td>Boiler efficiency</td> <td>85-90%</td> </tr> <tr> <td>Burner</td> <td>Single burner, Front end flange mounted, complete packaged including Control and power panel.</td> </tr> <tr> <td>Insulation</td> <td>Rock wool</td> </tr> <tr> <td>Cladding</td> <td>Aluminum</td> </tr> </table>		Design Code	Class-1 of ASME/BS/JIS/PED	Boiler Type	Natural Gas Fired, 3/ 4 pass, Wet Back Technology	Configuration	Horizontal, Skid mounted Design Pressure 11.5 bars	Working Pressure	10 bars (g)	Feed Water Temp	85 – 90oC	Steam generation	02/01/0.5 TPH @ 10Bars gas fired boiler (The procuring agency will specify)	Fuel	Natural gas	Boiler efficiency	85-90%	Burner	Single burner, Front end flange mounted, complete packaged including Control and power panel.	Insulation	Rock wool	Cladding	Aluminum
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ND Examination Radiography, UT, DPT; as per design code standard
Material Materials used shall be recommended for specific components by ASME/BS /JISPED

Power Supply Electric 380/3/50 PRESSURE VESSEL

Pressure vessel consisting of primarily of shell fire tubes, tube plates and furnace, made from material as specified by the ASME/BS/JIS /PED code, duly approved by the internationally renowned agency and stamped for compliance.

- a) Complete manufacturing process is to be inspected by the inspecting agency at various stages of construction; in case of locally fabricated.
- b) All welds and procedures adopted are to be strictly in accordance with the ASME/BS /JIS /PED codes.
- c) All tubes are to be rolled and, 2nd pass entry tubes are to be further welded to the rear and front tube sheets, as provided in the code. All welded joints to be checked by X-Ray and results are recorded as per the provision of the code.

Various openings for connecting of services or installation of safety devices are to be provided and reinforced as per the ASME/BS/JIS /PED code.

FEED WATER TANK (LOCAL MADE)

Construction Carbon Steel as per ASME/BS /JIS /PED Insulation Rock wool

Cladding Pre painted sheet

Capacity 2,000 L

Configuration Horizontal

Control Temperature and level controls with level glass

STRESS RELIEVING (if covered under design code ASME/BS/JIS/PED)

After the construction of the pressure vessel the entire unit is to be hydraulic tested and then relieved of stresses in a properly designed & appropriate facility.

Stress relieving is to be witness by the local representative of the inspecting agency; in case of locally fabricated. A certificate to this effect is to be provided.

After removal of the Unit from the stress relieving chamber it is to be again hydraulic tested. This test is to be witnessed by the appropriate inspecting agency; in case of locally fabricated. A certificate to this effect is to be also provided.

BURNER

- a) The Burner should be packaged type, fronted end mounted, factory tested and easily removable type.
- b) Complete packaged burner shall be of U.S.A. Japan or Europe to be forced draft combustion air system, utilizing a heavy duty backward curved impeller in a fully machined cats housing. Air housing should be of open able type for inspection and service of firing head components without detaching the burner from the boiler front end.
- c) Complete burner assembly is to be bolted to the front end of the boiler through the use of flange.
- d) Burner should be suitable to burn natural gas.
- e) High turn down capability is to assure smooth starts and response to wide load demands. The control switches, should permit selection of fixed rate or fully modulating

operation.

- f) Gas and combustion air are to be intimately mixed in the burner combustion head. Flash back is to be avoided as possible.
- g) The burner is to be listed by Underwriters Laboratory & carry a U.L. certification however other regulatory agency mentioned above may also be acceptable. Burner is to be completely assembled, wired and tested at the factory. Main gas train components like PRV, gas cock etc is to be shipped by the burner manufacturers.

VALVES & CONTROLS

1. Single control circuit operating at 220V 50Hz.
2. Burner mounted control panel.
3. Steam Stop Valve
4. Blow Down Valve
5. Isolation valve
6. Feed Check valve
7. Non return valve
8. Pressure gauge for Boiler pressure
9. Boiler water level control valve
10. Water gauge glass assembly
11. Pressure switch
12. Safety valves for Boiler
13. Temperature Gauges Dial type
14. Motor starters for 380/50/3.
15. Panel signal lights for, power "ON" ignition, flame fail, manual/auto, Gas operation.
16. Flame safeguard controller with ultraviolet flame detector. Controller to be of the "Self Check" design.
17. Combustion air interlock (switch).
18. Provision for interlock of low water cut off and operating pressure control.
19. External alarm bell to sound on main flame failure, low water.

Main line circuit breaker, Blower motor circuit breaker. Feed water pump air cut breaker.

TRIM SAFETIES AUXILIARIES AND OPERATING CONTROLS.

Packaged fire tube boiler shall include following trim, safety, operating controls and auxiliaries. These are to be wired into burner panel which is to provide appropriate interlocks.

Following are over & above the controls/auxiliaries/trim to be supplied with burner.

- Operating ON/OFF type pressure controller (Field adjustable).
- Solid state type low water cut off with feed water control side and gauge glass set with tri-cocks mounted on one side of boiler. Auxiliary gauge glass set with valves mounted on the other side.
- Stack thermometer.
- Coded safety relief valve not less than two.
- Combustion relief door.
- Alarm bell to sound on low water cut off, main flame failure, pilot flame failure, Hi-pressure etc.

NOTE (IN CASE OF TURN KEY PROJECT):

The turn-key project and all those piping, minor civil works, platforms, erection of mechanical/ electrical/ instrumentations, installation & commissioning shall be the responsibility of the Contracting firm. All other associated instruments/ equipment/ works required for safe

operation of the Boiler, as per design code will also be the responsibility of the Contracting firm.

All sorts of Chemicals for Phosphate treatments/ Chelates/ Polymeric sludge conditioners and dispersants/ Alkalinity builders etc will be the responsibility of the Contracting firm during the warranty and then regularly as per requirement.

CONDITIONS:

1. The unit must be designed and fabricated as per ASME/BS/ISO/JIS.
2. All equipment must be according to international safety standard as per ASME/BS/ISO/JIS.
3. The bids with drawing marked with piping routes, panels and other equipment by the manufacturer will determine the completeness of the bid.
4. All those piping, minor civil works, platforms, erection of mechanical/ electrical/ instrumentations, installation & commissioning shall be the responsibility of the Contracting firm.
5. All other associated instruments/ equipment/ works required for safe operation of the Boiler, as per design code will also be the responsibility of the Contracting firm
6. The Room/ foundation and utility services like water, electricity, Natural gas in the Boiler Room will be the responsibility of the Institute.

WATER TREATMENT UNIT

Local water treatment unit assembled with USA, Europe or Japanese components; will be provided. The capacity, flow and reservoir should be as per requirement of these systems.

The reverse osmosis unit including filters, hardness stabilizing unit, activated carbon with pre-filter 5um, Pre-filter 1um, DS reverse osmosis system. Capacity of 50/100/150 or higher L / h (As per actual requirement) Storage tank 1,000L (for laundry and CSSD). Level control for tank, vent filter, pressure pump, ion exchanger, conductivity meter control, distribution manifold, hose set and installation material.

PANEL OF MANUFACTURERS:

USA, EEC, Japan OR Local (if it is designed and manufactured according to ASME/BS/JIS/PED standards in collaboration with international manufacturer of USA, EEC or Japan origin).

APPROVED PVMS

Clinical Specialty	Allied Equipment and Machinery
Generic Name	HOSPITAL WASTE INCINERATOR
Clinical Purpose	To destroy the hospital infected waste
TECHNICAL SPECIFICATIONS	
<p>The INCINERATOR (waste management system) is a turn-key project which will comprise a hospital grade incinerator, allied accessories and operation for proper disposal of hospital solid waste material and imputed human organs. The incinerator shall also be suitable for plastic, paper, textile and rubber dry and wet infectious waste of the hospital. The unit shall be of high performance to be operated continuously for at least 12 hours daily. The primary source of fuel will be natural gas based on pyrolytic combustion with smokeless emissions having standby fuel arrangements of LPG as the pressure of natural gas drops and supply fluctuates throughout the year. For ensuring the clean environment, it should strictly comply with EPA standards having EIA certification. The system should have following specifications:</p>	
<p>BURNING CAPACITY: Continuous feeding and burning capacity of 50/100/150/200 kg / hour (The procuring agency will specify as per its requirement)</p>	
<p>CONSTRUCTION:</p> <ul style="list-style-type: none"> • Packaged type skid mounted rectangular shape dual chamber construction. • The steel sheet shall be at least 6-8mm thick & front of 10-12mm. It should be externally painted with heat resistant paint. • The internal surface of the incinerator shall be lined with non-cracking refractory bricks or cast able concrete to withstand a temperature of 1400 degree Centigrade backed by thermal insulation. The thickness will be from 220-250mm. SS for chimney. • The temperature of outer surface of the burning chambers should not rise beyond a temperature of 60 degree Centigrade after operation of several hours. 	
<p>PRIMARY CHAMBER (COMBUSTION):</p> <ul style="list-style-type: none"> • Primary chamber for Pyrolytic combustion mechanism and its volume will be according to the manufacturer's individual design. • Volume of primary chamber will be according to capacity in rectangular shape. • It should have separate doors for waste feeding and ash removal. The feeding door should be in accordance to load size. • Blower centrifugal fan(s) shall be provided to inject air to burn the waste and gases in combustion chamber. • Automatic electronically controlled air distribution and regulation system. • The temperature should not be less than 600 degree Centigrade. • A see through window with protection flap for inspection of burner's flame. • One electrically operated natural gas burner with the provision to operate on standby LPG fuel. • Thermocouple/sensors to monitor the temperature of the primary chamber. 	
<p>SECONDARY CHAMBER (POST COMBUSTION):</p> <ul style="list-style-type: none"> • The post combustion chamber for flue gases with retention time of 2.0 seconds to burn further for ensuring smokeless exhaust emissions. 	

- Volume of primary chamber will be according to capacity in rectangular shape.
- Blower centrifugal fan(s) shall be provided to inject high pressure air to burn the waste and gases in post combustion chamber for ensuring proper burning of gases before exhaust. These fans will have an automatic servo controlled system for proper pumping of air according to the requirements.
- Automatic electronically controlled air distribution and regulation system.
- The temperature should not be less than 1000C.
- Two medium electrically operated natural gas burners or one large with the provision to operate on standby LPG fuel.
- Thermocouple/sensors to monitor the temperature of the secondary chamber.

BURNERS:

- Combustion and post combustion chambers with electrically operated burners suitable for natural gas operation as well as standby LPG fuel.
- Regulated automatically for controlling temperature inside the chamber.
- Automatic closing of burners with opening of respective chamber's door.
- Electrical safeties to prevent startup of burner unless its shutter is fully opened.
- Closure of burner's shutter on its switching off.
- Protection from radiant fire bed.
- Two/three burners for ensuring proper burning of gases.
- Electrical power requirement 220V, 50Hz single phase.
- Average natural gas consumption 20-25 m³/hr.

STANDBY LPG FUEL:

There should be a manifold system for reserve LPG cylinders having sufficient capacity to run the incinerator for at least 12hrs.

FEED SYSTEM:

- Manual feeding system in batches.
- Calorific value of the feeding waste: 3500 – 4000 kcal/kg.

CHIMNEY:

- Circular mild steel aluminum clad or Stainless Steel self-supported flanged sections chimney.
- Lined with high grade cast able concrete or refractory bricks followed by insulation material.
- Proper port for taking sample of exhaust gases to monitor emission levels as per international standards provided with a cover to be opened and closed when necessary without affecting the chimney's function. The sampling port will be in proper direction for easy usage.
- The chimney shall have height of 15 meters or better from ground level.

GAS WASHER/ SCRUBBER:

- Mild steel/Stainless Steel integrated pass through type gas washing system with water sprayer and filter.
- Water saving system with re-circulating system and cooling tower.

WATER TREATMENT:

Water treatment unit to treat the water used for gas washing before opening it into main drain having settling tank (SS), manual/automatic unit.

CONTROLS:

- Microprocessor/PLC based control box with hinged sealed door.
- Pre-installed control circuitry should be rugged enough to withstand the temperature effect of the incinerator.
- It should house the ignition burner timer, feed interval timer, shut down timer post combustion chamber temperature controller, and controls for burner, blower fans, gas washer etc.
- Digital display of temperature and set timing parameters.
- The control panel shall be fitted with a functional synoptic view showing the operating situation of the whole installation
- Emergency Shutdown button for shutting it off in case of emergency.
- Electrical requirements 220V, 50Hz.

EMISSION STANDARDS:

Smokeless emission for at least 98% of running time.

The flue gases should have contents according to the National Environment Quality Standards (NEQS).

QUALITY STANDARDS:

The Incinerator (system and emission levels) should comply with the standards of their respective regions/country in addition to EBA Pakistan.

POWER REQUIREMENT:

Single/Three phase operation.

ACCESSORIES:

1. Manual ash removal tool
2. Manual particulate removal tool from water trough.
3. Digital weighing scale with minimum 60x60cm platform for weighing the waste.
4. Mobile main SS trolley (anti magnetic) for transportation of hospital waste from wards to incinerator site/room approx. 125cmx100cmx90cm (IO to decide), 20cm wheels size.
5. Bin trolley in yellow color with a flap to open cover (foot operated) to hold yellow plastic bag of 5kg mixed waste. MS with powder coating or heavy Fiberglass / Plastic
6. Plastic waste bags yellow, as per WHO approved standards for 5kg mixed waste
7. Pair of leather gloves for hospital waste handling staff
8. Pair of long rubber shoes for hospital waste handling staff
9. Masks for odor, disposable
10. Syringe cutter with lifting
11. Sharp Container (pulp), incinerate-able, 10L capacity

CIVIL WORKS:

- Following civil works, electrification etc will be conducted by the contracting firm:
- Incinerator room, waste storage/ segregation room will be constructed as per recommendations of the manufacturer and maintained at 4°C for storage.
- Electrical cables from main board to the incinerator.

- Provision and lying of gas pipeline.
- Construction/ lying of sewerage and water supply system for the incinerator.
- Civil works in the incinerator room will be considered as standard component of the installation of the incinerator.
- The construction will be conducted with A-1 materials.

SPECIAL TERMS & CONDITIONS:

1. The firm will get it approved/ certified from the EPA as per their requirements.
2. The contracting firm will install commission and operate the incinerator as a turn-key project.
3. The contracting firm shall maintain, control and supervise the incineration process, segregation of waste, periodic monitoring of exhaust gases by EPD for proper functioning and implementation of hospital disposal system
4. The contracting firm shall also impart training to the hospital staff and conduct the workshops so that after complete handing over the system, the hospital should have sufficient technical expertise and skilled persons competent to handle the infectious waste for its efficient disposal.
5. The contracting firm will be responsible for testing and maintaining of emission levels and get it monitored regularly by the EPA during warranty period.
6. The standby LPG fuel arrangement will be done by the firm but the hospital will pay the expenditures of LPG. The LPG cylinders must comply with international standards like BS/EN/DOT.

APPROVED PVMS

Clinical Specialty	Allied Equipment and Machinery
Generic Name	MORTUARY
Clinical Purpose	A mortuary is used for the storage of human corpses awaiting identification or removal for autopsy or disposal by burial, cremation or other method.
TECHNICAL SPECIFICATIONS	
<p>NOTE: The given below is the designed turnkey solution of complete hospital, in case of requirement of complete new system, procuring agency need to define the items required and quantities of each items as per the bed strength of hospital.</p> <p>In case of requirement of any of the given below equipment, with in the running/equipped hospital, Procuring agency may select the required items and define the quantities as per its actual requirement.</p>	
<p>MORTUARY REFRIGERATOR</p> <ul style="list-style-type: none"> • Preservation temp: from -10 C to -20 C individual door with Key locks. Litter trays of stainless steel on rail. Trays located on removable angle rails with extension door easy service, • Evaporator with automatic defroster and compressor, hermetically sealed air cooled vibration free adjusted to capacity of the refrigerator 2/3/4/6/8/10/12 (Procuring agency to select the required capacity) • Working on single phase/Three Phase (According to the capacity / Power load of mortuary unit) With all standard accessories including : Digital temperature display, interior light, card holders, alarm system, door frame heating, side window for inspection. • Voltage stabilizer compatible. • Operating ambient temperature 50°C or better. 	
<p>AUTOPSY TABLE</p> <ul style="list-style-type: none"> • Dissecting / Autopsy Table Fixed type. • Dissection table and organ basin may be quoted separately, Glue underlay to reduce noise, • Inclined in direction of sink. • Support column made from stainless steel with water- protected plug-in socket and lever mixing battery for cold and hot water with hose-shower. • With telephone showers. Built in sprinklers to wash the body. Slid able body support on table. • Attached notes table & organ weighing facilities. • Dimension Table approx. Length x Width x Height 2600 x 750 x 850 mm • Organ Basin approx. Length x Width x Height 400 x 500 x 250 mm with mesh basket. • <u>ORGAN TABLE</u> <ul style="list-style-type: none"> ○ Entirely from stainless steel. ○ The addable organ table facilitates dissection of individual organs. ○ Stable welding construction with inserted cutting plate and perforated instrument plate. The organ table can be moved forth and back the overall 	

length of the dissection table.

- **NECK SUPPORT**
 - Entirely from stainless steel
- **BODY SUPPORT**
 - Stainless steel in columns

INSTRUMENTS FOR AUTOPSY

- Scalpel metal handle
- Cartilage knife with wooden handle
- Scissors with head, 145 mm
- Bowel scissor, 210 mm
- Dissecting forceps, 160 mm
- Chirurgical forceps, 145 mm
- Chirurgical forceps, 250 mm
- Rachiotome , 160 mm
- Blow pipes, 250 mm
- Post Mortem needles
- Metal rulers 300 mm and 1.5 m
- Bone saw with spare blades.
- Bone saw with chargeable battery. (Oscillating) with spare blades.
- Bone shears, 230 mm
- Lexar Chisels, 230 mm
- Metal mallet
- Rachiotome 200 mm

Note: IO to specify the number accessories required. Minor deviation in sizes is acceptable.

ELECTRICAL SAW WITH BLADES

- The head (gear) can be sterilized in an autoclave.
- Supply tension ▶ 220/240 V – 50/60 Hz
- Oscillations 12000-21000/minute
- Each saw supplied with following:
 - No. 1 blade Ø 50 mm
 - No. 1 blade Ø 65 mm for deep cutting
 - No. 1 segment blade Ø 65 mm
 - No. 2 fixed-jaw spanners
 - No. 1 grease tube

WEIGHT SCALE FOR DEAD BODIES

Weighing Capacity: 200 Kg

WEIGHT SCALE FOR ORGANS

Weighing Capacity: 30 Kg

HYDRAULIC LIFTING TROLLEY

- Hydraulic lifting trolley with lateral rails (For insertion and extraction from the cold room)

- Length 2100 mm approx.
- Width 750 mm approx.
- Adjustable height 400 - 1800mm or better
- Weight Bearing Capacity 200 Kg
- Stainless steel with a double scissors lifting frame
- The oil-pressure lifting system by a hydraulic pump activated by foot/handle.
- Equipped with a flow regulator, two steering wheels and two free ones.

MOBILE INSTRUMENTS TROLLEY

- Made of Stainless steel
- Size: (800 x 940 x 500) mm (W x H x D)
- Castors 4 x \varnothing 125mm
- 2 Shelves

(To be locally supplied)

TRANSPORT TROLLEY FOR DEAD BODIES

- Completely made of stainless steel AISI 304.
- Made by an electro-welded tubular supporting frame
- On the trolley frame there should be completely stainless steel tray.
- The tray can be completely extracted; and can be even autonomously used as it is self-carrying.
- Equipped with 4 wheels diameter 200 mm
- Two wheels equipped with a pedal brake.
- Dimensions: mm. 2000 x 750 x 750 approx.

Clinical Specialty	Allied Equipment and Machinery
Generic Name	MEDICAL GAS PIPE LINE SYSTEM
Clinical Purpose	For supplying piped oxygen, nitrous oxide, nitrogen, CO ₂ and medical air to facility.
TECHNICAL SPECIFICATIONS	
<p>NOTE: The given below is the designed turnkey solution of complete hospital, in case of requirement of complete new system, procuring agency need to define the items required and quantities of each items as per the bed strength of hospital.</p> <p>In case of requirement of any of the given below equipment, with in the running/equipped hospital, Procuring agency may select the required items and define the quantities as per its actual requirement.</p> <p>APPLICABLE STANDARDS/ CONFIGURATION The Medical gas Pipe line should strictly comply with the international standards and configuration for requirements of HTM 2022 or latest, however, ISO 7396-1 or latest can also be used. It would be the choice of the bidder for adherence to any standard which would be mentioned in the bid. The objectives are to ensure the following:</p> <ol style="list-style-type: none"> a) Non-Interchangeability Between Different Pipeline Systems By Design; b) Continuous Supply Of Gases And Vacuum At Specified Pressures By Providing Appropriate Sources; c) Required Flow Rates In Particular Areas/ Outlets; d) Use Of Suitable Materials; e) Cleanliness Of Components; f) Correct Installation; g) Provision Of Monitoring And Alarm Systems; h) Correct Marking Of The Pipeline System; i) Following Of Testing And Commissioning Protocols; j) Maintaining The Purity Of The Gases Delivered By The Pipeline System; k) Correct Operational Management. <p>The firms will follow the specifications mentioned below and if found contradiction between specifications and design standard then the design standard would prevail (only if the quantities mentioned are less; otherwise adjustment will be made).</p> <p>AUTOMATIC MANIFOLD FOR OXYGEN. The Manifold shall be a fully automatic type & shall switch from “Bank in Use” to “Reserve” bank without fluctuation in delivery supply line pressure & without the need for external power after the switch over the “Reserve” bank shall then become the “Bank in Use” and the banking use shall become the reserve bank. The system should be able to maintain continuous supply in case of power failure.</p> <ul style="list-style-type: none"> • <u>CAPACITY:</u> (2 x 4), (2 x 8), (2 x 12), (2 x 16) &(2 x 20) with capacity of 100-120, m³/h. (The procuring agency to select the required manifold capacity. Other than the defined, bank capacity may 	

be increased or decreased as per requirement).

- **FUNCTION:**

- Fully automatic self-contained shuttle-valve with no electrical power required for switching.
- Microprocessor controlled display unit for monitoring of different parameters and loggings (if the design/standard (latest versions) allow for this requirement; otherwise the system standard design with standard design requirements will be followed).
- Units of pressure measurement (psi/Pa/bar).
- LCD /LED display for the left bank, the right bank & for the supply pressure. Complete with relief valve, Emergency shut off valve and battery / bank room alarm for left and right cylinder bank.
- VIE Connection with shut off valve, controlled by the manifold cabinet.
- The primary source of Oxygen will be the VIE System.
- The complete automatic manifold unit with shifting from VIE System to Main Bank and then to Reserve Bank automatically with display of pressures for each source.
- Equipped with NIST Connection.

AUTOMATIC-MANIFOLD FOR NITROUS OXIDE

The Manifold shall be a fully automatic type & shall switch from "Bank in Use" to "Reserve" bank without fluctuation in delivery supply line pressure & without the need for external power after the switch-over the "Reserve" bank shall then become the "Bank in Use" and the bank in use shall become the reserve bank. The System should be able to maintain continuous supply in case of Power failure.

- **CAPACITY:**

(2 x 4), (2 x 8), (2 x 12), (2 x 16) & (2 x 20) with capacity of 70-90, m³/h. (The procuring agency to select the required manifold capacity. Other than the defined, bank capacity may be increased or decreased as per requirement).

- **FUNCTION:**

- Fully automatic self-contained shuttle-valve with no electrical power required for switching.
- Microprocessor controlled display unit for monitoring of different parameters and loggings (if the design/standard (latest version) allow for this requirement; otherwise the system standard design with standard design requirements will be followed)
- Units of pressure measurements (psi/Pa/bar)
- LCD / LED display for the left bank, the right bank for the supply pressure. Complete with relief valve, Emergency shut off valve and battery / bank room alarm for left and right cylinder bank.
- Equipped with NIST Connection

AUTOMATIC-MANIFOLD FOR CARBON DIOXIDE and ENTONOX (IO to specify)

The Manifold shall be a fully automatic type & shall switch from "Bank in Use" to "Reserve" bank without fluctuation in delivery supply line pressure & without the need for external power after the switch-over the "Reserve" bank shall then become the "Bank in Use" and the bank in use shall become the reserve bank.

The System should be able to maintain continuous supply in case of Power failure.

- **CAPACITY**

(2 x 4), (2 x 8), (2 x 12), (2 x 16) & (2 x 20) with capacity of 30-50, m³/h. (The procuring agency to select the required manifold capacity. Other than the defined, bank capacity may be increased or decreased as per requirement).

- **FUNCTION:**

- Fully automatic self-contained shuttle-valve with no electrical power required for switching.
- Microprocessor controlled display unit for monitoring of different parameters and loggings (if the design/standard (latest version) allow for this requirement; otherwise the system standard design with standard design requirements will be followed).
- Units of pressure measurements (psi/Pa/bar)
- LCD / LED display for the left bank, the right bank for the supply pressure. Complete with relief valve, Emergency shut off valve and battery / bank room alarm for left and right cylinder bank.
- Equipped with NIST Connection

GAS OUTLETS (BS/DIN SYSTEM)

Gas outlets, complete in Box/casing gas Specific, Self-sealing valve, indexed to eliminate interchangeability /erroneous tapping of gas, Filter and cover plate as per Standard Design requirements of the bidder with following color coding;

Oxygen White

Nitrous Oxide Blue

Carbon Dioxide Grey

Compressed Air 4 bar Black/ B&W Stripes Vacuum. Yellow

Surgical Air @ 07 bar B&W Stripes

BED HEADS UNIT FOR ICU

- Each unit consists of: 1,500 mm and above
- Horizontal type with railing
- Built in over bed Light with ON/OFF switch.
- Built in reading Light with ON/OFF switch.
- Provision for Nurse Call/ Alert Button
- Gas outlets (1x Vacuum, 2x Air, 2x Oxygen complete fitted).
- Electrical provisions;
- Electrical sockets: 6 Nos. & 2Nos. Multi Pin Plug and above schuko/ F-type All wiring conforms to standards, ground/earth
- Monitor shelf with railing clamp
- IV pole with railing clamp
- Separate ducts for Electrical & Gas Pipes.

BED HEAD UNIT FOR WARDS& PRIVATE ROOM

- Each unit consists of: 1,000 mm and above
- Horizontal type
- Built in over bed Light with ON/OFF switch.
- Built in reading Light, with ON/OFF switch.
- Provision for Nurse Call/ Alert Button
- Gas outlets (1x Vacuum, 1x Air, 2x Oxygen complete fitted).

- Electrical provisions;
- Electrical sockets: 4 Nos. & 2Nos. Multi Pin Plug and above schuko/ F-type All wiring conforms to standards, ground/earth
- Separate ducts for Electrical & Gas Pipes.

ALARM AREA WITH REMOTE SENSORS

Alarm area with remote sensors for two/three/four/five/six gases. (Procuring agency to specify in accordance with the requirement)

Individual display and sensor module.

Self-diagnostic & error message display readable for ease of maintenance psi, kPa or bar read out. Test & Mute Button, low alarm condition.

MULTIPLE ZONE VALVE BOX

Multiple zone valve box for two/three/four/five/six gases. (Procuring agency to specify in accordance with the requirement)

Each wall type zone valve box shall consist of the following Components. A steel valve box which can house two to six shutoff ball valves.

Pressure gauges to display the pressure of various gases.

CEILING PENDANTS FOR THEATRES:

- **CEILING PENDANTS FOR ANESTHETIST**

Ceiling pendants with 300 Degree rotating arm Adjustable height with pneumatic brakes. Height 750 mm

Payload of minimum 150kg

Hooks/ Clamps to lift the anesthesia machine

Two shelves for monitor and/ or other equipment/ accessories

Outlets with arm for 2xO₂, 2xAir (4 & 7 bar), 1xVacuum, 2xN₂O & 1xAGSS with color coded hoses & terminal unit, user-definable hose length integral fist fix check valves. 6xElectrical Sockets; schuko/ F-type, Switches and facility for low voltage outlet for data transmission/ telephone/NC system.

- **CEILING PENDANTS FOR SURGEON**

Ceiling pendants with 300 Degree rotating arm Adjustable height with pneumatic brakes. Height 750 mm

Payload of minimum 80kg

Two shelves for other equipment/ accessories

Outlets with arm for 2xAir (7 bar) with color coded hoses & terminal unit, user-definable hose length integral fist fix check valves. 6xElectrical Sockets; schuko/F type, Switches.

OXYGEN & AIR FLOW METER

- Oxygen flow meter with humidifier and probes Oxygen Flow meter complete set from 1 to 15 lpm With autoclave able and unbreakable humidifier bottle
- For neonate / Paeds (0-6 lpm)

VACUUM REGULATOR WITH GAUGE / DIGITAL

- The Vacuum Controller should be connected to Wall Source of Vacuum using direct probe or rail mounting System. Vacuum Levels 0 to 750 mm Hg complete with 1 Liter

suction Bottles, Unbreakable/ Autoclaveable (2 each). Complete with overflow safety system.

- For neonate / Paeds (0-220 mmHg)

COPPER PIPING

Supply and installation of seamless medical graded copper pipe, deoxidized and degreased along with required fitting etc., various sizes /diameter as per Drawing of the project and Design standard of the bidder with matching color indications of out lets. The sizes will vary from minimum of 10mm to onward as per design offered by the firm;

Oxygen	White
Air	Black/ B&W Stripes
Nitrous	Blue
Vacuum	Yellow Carbon Dioxide Grey stripes

ANESTHESIA SCAVENGING SYSTEM

Passive/ Active Anesthetic Gas Scavenging System designed to remove exhaled anesthetic gas mixtures from operating theatres.

DUPLEX/ TRIPLEX MEDICAL VACUUM SYSTEM

(procuring agency to define the requirement out of duplex or triplex medical vacuum system)

The capacity of Vertical Vacuum System is 500/ 1000 / 1500 / 2000/ 2,500 L/min per vacuum pump

(The mentioned specifications are in accordance with the 2500 L/min. The procuring agency may define the Capacity as per its actual requirement, in case of any other option selection; all the other feature values will be changed according to the selection of required capacity as per manufacturer's standard design.

Vacuum level @ 700-725 mm Hg.

Vibration Isolation, Pads, Hour meters, Circuit barkers, Vacuum pump run lights.

Tank mounted system. Complete with filters.

Vertical Tank Capacity 1,000 Liter. Or as per actual requirement.

MEDICAL COMPRESSED AIR STATION

(procuring agency to define the requirement out of duplex or triplex medical air compressor system)

Medical Air Plant with Breathable Air. Elimination of Toxic Gases such as carbon dioxide, Nitrogen dioxide, Nitrogen monoxide, Carbon monoxide; and other pollutants as per European Pharmacopeia standard; followed.

COMPRESSOR

- Duplex Compressor unit.
- Reciprocating/ Screw/ Scroll type. (IO to specify)
- Capacity of air producing approximately minimum of each compressor: - 2500 liters/min/FAD at 13 bar.
- Mounted on anti-vibration base.
- The other capacities of medical air compressor System are 500/ 1000 / 1500 / 2000/ L/min per medical compressor

(The mentioned specifications are in accordance with the 2500 L/min. The procuring agency may define the Capacity as per its actual requirement, in case of any other option selection, all the other feature values will be changed according to the selection of required capacity

as per manufacturer's standard design)

RESERVOIR

- Compatible medical grade.
- Air receiving tank 1,000 L. or as per actual requirement.
- Vertical type.
- Galvanized internally with auto drain.
- Minimum 13 bars out put pressure of tank.

AIR DRYER

- Desiccant type, Duplex.
- Dew Point range between -40 to -80oC
- Dew point monitoring on LCD Panel
- Capacity suitable according to the compressor output.
- Including oil water separator.

FILTRATION SYSTEM

- Clean Medical Grade Air supply in accordance with the requirements of HTM/ISO standards.
- Consisting of Pre-filter / humidity, Oil free and sterile/bacteria filter.
- Mounted with shut-off valves on an assembly panel.
- Parallel Connections of the filters. This will make it possible to exchange filter without interrupting the air supply.
- Flow / filtering rate according to the compressed air output.

REDUCER PANEL COMPRESSED AIR

- Parallel switched reducer with gauge, safety valve, pressure switch for high and low Pressure and shut off valve with assembly panel size 4+ 7 bar.
- Complete with distribution block according to requirement, Incl. Shut off valve and pressure gauge for every distribution block, complete assemble panel with incoming and outgoing copper pipe for complete system.

CONTROL

- Complete with 1x main warning system for compressed air for visual and acoustic monitoring of alarms conditions for the compressor room.
- Test point in the system for air quality.
- 1x switch cabinet for automatic Unit incl. All necessary fitting and installation material for smooth running of the system without any interruption.

POWER:

Power Supply- 3 Phase, 380 – 400V/50 Hz.

SPECIAL TERMS & CONDITIONS:

1. The Major equipment like manifold, pendants, bed head units and outlets should be manufactured and supplied by the same Principal.
2. The Vacuum System and medical air compressor may be of different manufacturer but should be supplied by the same manufacturer of medical gas pipeline system.
3. All equipment must be according to international safety standard.
4. The color of outlets, piping and cylinder for recognition will be BS type for all the system equipment.
5. The drop outlet/ Connection will be flushed surface. Separate ducts for piping and electrification.

Clinical Specialty	Allied Equipment and Machinery
Generic Name	POSITIVE COLD ROOM
Clinical Purpose	For keeping bodies for several weeks with ongoing decomposition. Bodies that have been identified or autopsy has been done upon them they are stored in positive cold room because it does not prevent decay.
TECHNICAL SPECIFICATIONS	
<p>POSITIVE COLD ROOM</p> <ul style="list-style-type: none"> • Size 40m³ • Required refrigerant of cold room is R404A or equivalent. Required Cooling range is 3900 to 4000 W. • Treated air flow range must be 1800 m³/h Approx. Air projection of the system is 10 m Approx. • Compression type should be hermetic. De-Icing through hot gas cycles. • Required Insulation material of cold room is polyurethane or equivalent. Insulation thickness range should be 100mm to 110mm. • Foam Density 40 kg/m³ Approx. • K value of Panel, 0.22 W/m².K Approx. • Ambient temperature of usage should be up to +45 Degree Centigrade. Temperature range +2 Degree Centigrade to +8 Degree Centigrade. • Provision of galvanized shelves with five levels each with 100 Kg load bearing of every level, depth should be 500mm to 450 mm. • The interior should have door safety, lighting, strip curtains, Anti slippery floor and thermometer (-40 C to +40 C). • The systems should have redundancy of the refrigeration units with manual switch over. • The system should have independent temperature recorders with discs and power reserves. Power Supply/Frequency: 380- 400 Volt / 50 Hz • Prequalified manufacturer of WHO. 	

Clinical Specialty	Allied Equipment and Machinery
Generic Name	NEGATIVE COLD ROOM
Clinical Purpose	For keeping bodies when not been identified at this temperature body frozen and decomposition reduced. Bodies that are stored for preservation reduced for autopsy in future are stored in negative cold room and prevent decay.
TECHNICAL SPECIFICATIONS	
<ul style="list-style-type: none"> • Size 40m³ • Required refrigerant of cold room is R404A or equivalent. Required Cooling range is 4000 -45000 W. • Treated air flow range must be 3900 m³/h Approx. Air projection of the system is 10 m Approx. • Compression type should be hermetic. De-Icing through hot gas cycles. • Required Insulation material of cold room is polyurethane or equivalent. Insulation thickness range should be 100mm to 110mm. • Foam Density 40 kg/m³ Approx. • K value of Panel, 0.22 W/m².K Approx. • Ambient temperature of usage should be up to +45 Degree Centigrade. Temperature range -20 Degree Centigrade to -15 Degree Centigrade. • Provision of galvanized shelves with five levels each with 100 Kg load bearing of every level, depth should be 500mm to 450 mm. • The interior should have door safety, lighting, strip curtains, Anti slippery floor and thermometer (-40 C to +40 C). • The systems should have redundancy of the refrigeration units with manual switch over. The system should have independent temperature recorders with discs and power reserves. Power Supply/Frequency: 380- 400 Volt / 50 Hz • Prequalified manufacturer of WHO. 	

Clinical Specialty	Bio-Medical Engineering
Generic Name	DIGITAL OSCILLOSCOPE
Clinical Purpose	It is used by Bio-Medical Engineer and Technologist to measure small and large AC and DC signals present inside circuit boards of any of the Bio-Medical Equipment. It assists in detection of the faulty signals / components / boards present inside electronic circuitry of the equipment.
TECHNICAL SPECIFICATIONS	
<ul style="list-style-type: none"> • Bandwidth 100Hz or better • Channels 2 or better • Rise time < 3.5ns • Sample rate 2 GSa/s or better • Maximum acceptable input voltage 400V (DC + AC) • Input ports DC, AC, GND • USB and LAN Interface • Math operations like Add, Subtract, Multiply, Divide, FFT • "Can measure Vpp, Vmax, Vmin, Vamp, Vtop, Vbase, Vavg, Mean, Crms, Vrms, ROV, FOV, RPRE, FPRE, • FREQ, Period, Rise Time, Fall Time, BWid, + Wid, - Wid, + Duty, - Duty, Phase, FRR, FRF, • FFR, FFF, LRR, LRF, LFR, LFF" • Display 7" TFT or better • Display Resolution 480 x 234 or better • Operatable on 220V 50Hz AC input 	
Accessories:	
Passive probes (one per channel), power cord, USB cable	

Clinical Specialty	Bio-Medical Engineering
Generic Name	ECG ANALYZER
Clinical Purpose	It is used by Bio-Medical Engineer and Technologist to test ECG machine accuracy and fault detection. It acts like a patient and generate ECG that can be readily detected and measured on a ECG machine.
TECHNICAL SPECIFICATIONS	
<p>Rate: 30 to 320 BPM Amplitude: 0.15 to 5mV Waveforms: Sine, Triangle, Square Atrial Pacer, Ventricular Pacer Arrhythmia : Atrial, Ventricular Respiration: Normal Physiological Simulation Blood Pressure Impedance 350 Ohms Excitation 2 to 16 Volts Synchronized with all normal sinus rates Physiologically track all arrhythmia selections Accuracy $\pm 1\%$ of reading Display LCD Key Pad Output Connectors ECG</p>	

APPROVED PVMS

APPROVED PVMS

Clinical Specialty	Bio-Medical Engineering
Generic Name	VENTILATOR ANALYZER
Clinical Purpose	It is used by Bio-Medical Engineer and Technologist to analyze and calibrate different available parameters in the ventilator including gas pressure, temperature & humidity measurement, Volume measurement, flow measurement, O2 concentration measurement etc.
TECHNICAL SPECIFICATIONS	
<p>Flow measurements for oxygen, air and nitrous oxide, both high and low range Volume measurement</p> <p>Pressure measurement high and low range for compressed gasses and patient pressure Oxygen concentration form 0 -100%</p> <p>Gas temperature measurement</p> <p>Gas humidity measurement</p> <p>Interface with RS232,Ethernet,US to shift data on PC or Printer</p> <p>Following To be supplied Locally:</p> <ul style="list-style-type: none"> • Digital Oscilloscope (100 MHZ) • IC Tester • Oscilloscope(50 MHZ) (01) Digital Power Supply • Digital Multimeter • Analog Meter • Watt Meter • Soldering Station 	

APPROVED PVMS

Clinical Specialty	Bio-Medical Engineering
Generic Name	HIGH VOLTAGE ANALYZER
Clinical Purpose	It is used by Bio-Medical Engineer and Technologist to analyze high voltages in the sophisticated Bio-Medical equipment. It assists in calibration and fault detection of the high voltages generated inside equipment.
TECHNICAL SPECIFICATIONS	
Maximum system voltage 11kV Maximum voltage to earth 6.6kV Threshold voltage 300V Sensitivity AC/DC 2.3mA nominal @6.6kV 7uA nominal @ 13.8kV Length (mm) 330Contact electrode type :Domed	

APPROVED PVMS

Clinical Specialty	Bio-Medical Engineering
Generic Name	SPO2 ANALYZER
Clinical Purpose	It is used by Bio-Medical Engineer and Technologist to analyze the oxygen saturation of the patient. It also assists in calibration of the oxygen saturation reader.
TECHNICAL SPECIFICATIONS	
Simulation Optronic (Electronic & Optical), indirect via probe adaptor box Simulation via Probe & full chain Range 50 to 100% Heart Rate 20-300 bpm Accuracy \pm 1bpm Arrhythmias :Tachycardia, Bradycardia, (upgrade) Artifacts: Motion, light (AC-DC) (upgrade)	

APPROVED PVMS

Clinical Specialty	Bio-Medical Engineering
Generic Name	ELECTRICAL SAFETY ANALYZER
Clinical Purpose	It is used by Bio-Medical Engineer and Technologist to analyze power in the circuit in different phases. It informs about any abnormal voltage being generated or delivered in the circuit. It can check point to point voltage, resistance and leakages.
TECHNICAL SPECIFICATIONS	
Power Measurement: Method VA rating Range 0.1KVA – 4KVA Accuracy $\pm 10\%$ + 2 counts Mains Outlet Test: Input Voltage Range 0-300V AC, max current 16A Measures L – E, N – E & L – N Accuracy $\pm 5\%$ of reading + 2 counts IEC Mains Lead Test: Test Duration 2s	

APPROVED PVMS

Clinical Specialty	Bio-Medical Engineering
Generic Name	VITAL SIGN MONITOR ANALYZER
Clinical Purpose	It is used by the Bio-Medical Engineer and Technologists to the multiple parameters available in the vital signs monitor and assists in their calibration and fault detection. These parameters include IBP, NIBP, O2 Saturation, ECG, Arrhythmias etc.
TECHNICAL SPECIFICATIONS	
<p>Non-invasive Blood Pressure Simulation Waveform Oscillometric Digital Manometer Oxygen Saturation: Range 50 to 100% Accuracy ± 1 bpm ECG Arrhythmia Simulator: ECG Full 12 lead simulation including high level output Performance Waveforms Sine, Square, Triangle, and Pulse Pacer Waveforms Synchronous Atrial, Asynchronous Atrial Arrhythmia Waveforms: Temperature: Range 37 and 41°C Respiration: Rates 5, to 180 Breaths per Minute Apnea Simulation Invasive Blood Pressure: Channels 2 channels Static: 0 to 300mmHg. Typed values Dynamic: 0 - 300mmHg for systolic & diastolic</p>	

APPROVED PVMS

Clinical Specialty	Bio-Medical Engineering
Generic Name	ELECTROSURGICAL ANALYZER
Clinical Purpose	It is used by the Bio-Medical Engineer and Technologists to test the cutting and coagulation powers that are being actually delivered to the patients. It assists in calibration of the electrosurgical / cautery machine.
TECHNICAL SPECIFICATIONS	
<p>The required characteristics and specific /critical functional requirements. e.g. modules, components, measured and/or delivered parameters and associated values and ranges, compatibility / inter-operability requirements, etc.</p> <p>User interface information requirements (e.g. display of pressure, volume, flow, status indicators, inspiration and expiration times, etc.) and format (continuous waveform display, digital, trends, etc.).</p> <p>Device functional parameters, alarms, language, etc. that should be adjustable at the discretion of the users.</p> <p>Detailed requirements</p> <p>Displayed parameters</p> <p>User adjustable settings</p>	

Clinical Specialty	Bio-Medical Engineering
Generic Name	DEFIBRILLATOR ANALYZER
Clinical Purpose	It is used by the Bio-Medical Engineer and Technologists to test the energy being actually delivered by the Defibrillator to the patient. It assists in the calibration of the defibrillator.
TECHNICAL SPECIFICATIONS	
<p>Energy Range 0-550 Joules Internal Load 50Ω non inductive External Loads 25 - 200Ω Voltage 0 - 6000V</p> <p>Current 0 - 120A Cardiac Synchronization</p> <p>ECG Full 12 lead simulation including high level output</p> <p>Waveforms NSR, Atrial, Conduction, Ventricular and Pacer wave forms Rate 20 – 300BPM</p> <p>Wave forms: Sine, Square, Triangle and Pulse External Connections</p> <p>External paddle and load box PC Connections</p>	

APPROVED PIMS

Clinical Specialty	Bio-Medical Engineering
Generic Name	MECHANICAL TOOL KIT
Clinical Purpose	It is used by the technologists to repair the most of the Electro-Medical Equipment available in the hospital at the installation site. It helps technician to decrease downtime of the equipment and make it functional quickly.
TECHNICAL SPECIFICATIONS	
<p>Screw drive large - type Screw drive large + type Screw drive X large - type Screw drive X large + type Screw driver thin long - type Screw driver thin long + type Thumb screw driver + type Thumb screw driver - type Tweezers Brush Hex Saw small Lock opener Scrubber Star Kit Soldering Iron Soldering Wire Soldering paste Files Combination pliers Flat nose pliers Side cutter Knife cutter Monkey wrench Wrench Adjustable spanner full kit Allen keys star Allen keys Torch Watch maker set Teflon tape Sand paper Clamps Depoxi Wraps Alcohol Swaps Gloves Gauze swabs Contact cleaner WD 40 Pipe Wrench</p>	

Glue (elfi) pack
Fuse (1A, 1.5A, 2A, 2.5A, 3A, 3.5A, 10A)
Glue Gun
Glue Gun sticks
Wire Cutter
Wire Stripper

NOTE: Procuring agency to specify number of quantities required.

APPROVED PVMS

Clinical Specialty	Emergency Medical Services
Generic Name	ADVANCE LIFE SUPPORT AMBULANCE
Clinical Purpose	To provide acute medical care to cardiac patient and to transport them to cardiac care unit.
TECHNICAL SPECIFICATIONS	
<p>MODEL CLASS Latest production. High Roof.</p> <p>ENGINE TYPE Two rear wheel Drive.</p> <p>ENGINE DISPLACEMENT Four cylinders, four strokes Diesel. Naturally aspirated or Turbo charged, 2500-3000 cc.</p> <p>AIR-CONDITIONER AND HEATER Fully air-conditioned (originally fitted) and standard heater. PATIENT COMPARTMENT Minimum patient compartment size must be 2700 x 1500 x 1600 mm (L x W x H) STEERING: Right hand drive</p> <p>BRAKES: Hydraulic / pneumatic</p> <p>STANDARD ACCESSORIES:</p> <ol style="list-style-type: none"> a) Tool Kit. b) Spare Wheel. c) Vehicle Manuals. d) Standard Fire Extinguisher (Halotron). e) Standard instruments and accessories. f) Front seat safety belts. <p>GENERAL The ambulance must be assembled / fabricated by professional fabricators with proper industrial set up, strictly in accordance with international standards.</p> <p>AMBULANCE COMPONENTS, EQUIPMENT AND ACCESSORIES:</p> <ul style="list-style-type: none"> • Red Crescent Sign and word AMBULANCE on front / rear sides and Name of Institution with logo on left and right sides. • Side and back window glasses will be partially frosted. • Main Stretcher <ul style="list-style-type: none"> ○ Collapsible type ○ Aluminum Alloy material ○ Three sections stretcher top with adjustable head and foot section. Head section can be raised at any desired position. ○ Castors 6- Nos. and two will be used in the collapsible position. ○ Vinyl Leather bed and body straps. 	

- Side protections
- Weld free fabrication.
- Right and front Side stretcher-locking mechanism in patient cabin.
- Overall Dimensions
 - Length 78"
 - Width 22"
 - Maximum Height in full standing condition 48"
 - Minimum height in collapsible condition 12"
- Fiber Glass Spine-Board with straps (18"x72") and Head Immobilizer system
- Sub Stretcher folding type, Aluminum Alloy.
- Four persons seat with straps and seat belts. (Genuine seats of the van will be used)
- Folding One-person crew seat with seat belts. (Genuine seat of the van will be used)
- Instrument and medicine storage cupboard and boxes with dividers, durable material.
- Standard Horizontal Red Strobe light set (combination of rotary lights, siren, speaker, amplifier and microphone). Spot lamp with flexible neck for patient examination.
- Back flood light for patient handling.
- Hooks for intravenous infusion set.
- Linoleum flooring with a ply wood of 5-layers.
- Standard size oxygen cylinder (MF type) with one standby containing regulator, pressure gauge, flow meter, humidifier, key, masks with tubing ready for oxygen delivery through two outlets installed in patient cabin.
- Portable First Aid box – Standard.
- Trash box 5L with lid (SS material non magnet).
- Portable Oxygen cylinder with masks and regulator.
- Ice box, Plastic 02 liters.
- Re-chargeable portable Torch and emergency light.
- Universal Resuscitation hard carrying case with following items:
 - Manual resuscitators (Ambobag), Adult and Paeds size.
 - Laryngoscope with straight and curved blades.(USA, Europe and Japan)
 - Endotracheal tubes (all sizes)
 - Stethoscope (01) (USA, Europe and Japan)
 - Professional Torch
 - Tongue depressor (disposable) (one box)
 - Airways assorted sizes.
 - Mouth gag.
 - Disposable gloves
 - Contaminant bags
 - Thermometer, flat type.
 - Hammer with rubber ends for examination.

(Note: Procuring agency to specify number of quantities required)

MEDICAL EQUIPMENT :(USA ,Europe and Japan)

1. Single Channel ECG machine with 50 rolls.
2. Transport Emergency Ventilator, 5 Inch Screen Display, Adult/Paeds. Battery operated with 6- hour's backup time.
3. Battery operated rechargeable Suction apparatus, 20 l/min, 500 mmHg, single two liters with 2- autoclave able bottles.
4. Oxygen saturation monitor with NIBP measurement, adult and Paeds cuffs.

5. Nebulizer- Battery operated, Rechargeable.

6. Fully Automatic External Defibrillator

- Battery Operated.
- Biphasic mode
- Automatic and manual operation.
- ECG monitoring
- External pace maker facility, built-in.
- 100- Paeds, adult and Pediatric.

NOTE: The fabrication and fitting of the equipment will be ensured for its safety during transportation.

APPROVED PVMS

Clinical Specialty	Emergency Medical Services
Generic Name	BASIC LIFE SUPPORT AMBULANCE
Clinical Purpose	To provide acute medical care and transport to patients.
TECHNICAL SPECIFICATIONS	
<p>MODEL Latest production. High Roof / Standard Roof.(Procuring agency to specify)</p> <p>ENGINE TYPE & DISPLACEMENT Two rear wheel Drive Four cylinders, four stroke Diesel. Engine Naturally aspirated or Turbo charged, 2500-3000 cc.</p> <p>AIR-CONDITIONER AND HEATER Fully air-conditioned (originally fitted) and standard heater.</p> <p>PATIENT COMPARTMENT Minimum patient compartment size must be 2700 x 1500 x 1600 mm (L x W x H)</p> <p>STEERING Right hand drive</p> <p>BRAKES</p> <ul style="list-style-type: none"> • Hydraulic / Pneumatic Standard Accessories: • Tool Kit. • Spare Wheel. • Vehicle Manuals. • Standard Fire Extinguisher (Halotron). • Standard instruments and accessories. • Front seat safety belts. <p>GENERAL The ambulance must be assembled / fabricated by professional fabricators with proper industrial set up, strictly in accordance with international standards.</p> <p>AMBULANCE COMPONENTS, EQUIPMENT AND ACCESSORIES</p> <ul style="list-style-type: none"> • Red Crescent Sign and word AMBULANCE on front / rear sides and Name of Institution with logo on left and right sides. • Side and back window glasses will be partially frosted. • Main Stretcher <ul style="list-style-type: none"> ○ Collapsible type ○ Aluminum Alloy material ○ Three sections stretcher top with adjustable head and foot section. Head section can be raised at any desired position. ○ Castors 6- Nos. and two will be used in the collapsible position. ○ Vinyl Leather bed and body straps. 	

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 - Disposable gloves.
 - Contaminant bags.
 - Thermometer, flat type.
 - Hammer with rubber ends for examination.

(Note: Procuring agency to specify number of quantities required)

MEDICAL EQUIPMENT :(USA ,Europe and Japan)

- Battery operated rechargeable Suction apparatus, 20 l/min, 500 mmHg, single two liters with 2- autoclave able bottles.
- Nebulizer- Battery operated, Rechargeable.

NOTE: The fabrication and fitting of the equipment will be ensured for its safety during transportation.