Annexure "B"
Technical Manual

There would be three types of OTs in the District Hospitals- General, Orthopedic and Pediatric.

The following Operation Theatre equipments as per the specification given has to be operated on rental basis, depending on the kind of OT to be established in each DH -

SCHEDULE 1

1.1 OT TABLE (MAJOR ITEM)

1. It should have Five section table top with divided foot section
2. Table top should be constructed from a high-pressure laminate to permit x-ray penetration and fluoroscopy
3. The table should be electrically operating (Actuator Driven)
4. It should have rechargeable battery.
5. The table should have wired remote control for all functions.
6. The casings on the frame and centre supporting column should be made of hygienic stainless steel
7. The table should be radio lucent ,C- arm compatible and suitable for fluoroscopy
8. The Mattress should be radio lucent and suitable for fluoroscopy
9. Measurements :(all dimensions are approximated to +/_ 10 % variations)

a. Height:	730-1040 mm
b. Side tilt:	+ 15 degrees
c. Back section adjustment	- 15 degrees to 70 degrees
d. Foot section adjustment	- 90 to 0 degree, detachable
e. Trendelenburg	25 degree
f. Anti Trendelenburg	25 degree
g. Head section adjustment:	-40 to -30 degree, detachable
h. Maximum width:	555 mm
i. Length:	1950 mm

10. Accessories should include the following
    a. Padded arm rest with straps - pair with damps
    b. Anesthesia screen with clamps
    c. Side supports: pair with clamps
    d. Shoulder supports: pair with clamps
    e. Knee crutches: pair with damps
    f. X-ray cassette tray

g. Kidney bridge
h. SS bowl with clamps
i. I.V. rod with clamp

1.2. OT TABLE {PAEDIATRIC} (MAJOR ITEM)

1. It should be an electric table and can be used for all standard procedures of surgeries for neonates, infants and children.
2. It should be four section table top with divided foot section
3. The table should be electrically operating (Actuator Driven)
4. It should have rechargeable battery.
5. The table should have wired remote control for all functions
6. The length of table should be 1800 mm
7. It should have Width in the range 400 to 600 mm
8. The movements of the table should be as follows-

i.	Raising and lowering	i. Minimum height 650 mm ii. Maximum height 1100 mm
ii.	Lateral tilt	Left/right 28 degrees
iii.	Trendelenburg and reverse	30 degree
iv.	Backrest section	70 degrees up right, 30 degree down
v.	Leg section	completely flat to right angle and detachable
vi.	Headrest	+25 degree / -45 degree (Detachable)
vii.	Kidney Bridge	
viii.	Longitudinal displacement of the tabletop	250 mm

9. The table should be radio lucent ,C- arm compatible and suitable for fluoroscopy
10. The Mattress should be radio lucent and suitable for fluoroscopy
11. It should mounted on Castor Wheels
12. It should have mechanical pedal brake – for firm and rigid locking
13. It should have Brake release
14. It should have Radiolucent top and cassette carrier
15. It should have Stainless steel base, body and accessories.

16. It should be Lightweight and excellent maneuverability
17. It should have Electro hydraulic pump in addition to the hydraulic foot pump
18. Remote hand control should be there to activate the electro hydraulic pump
19. Table should have following adjustments–
    i. High/ Low,
    ii. Trendelenburg & lateral tilt position,
    iii. lithotomy position
20. System should be supplied with following for all the standard procedures of surgeries for neonates, infants and children.
    i. System as specified
    ii. Anaesthetic frame
    iii. Padded side support
    iv. Intravenous arm board
    v. Padded Shoulder Support
    vi. Wristlets
    vii. A pair of knee crutches
    viii. Foot rest with stainless top
    ix. Armrest
    x. Body restraint strap
    xi. Wrist strap
    xii. Infusion rod
    xiii. Attachment clamp
    xiv. Head ring
    xv. Rack for accessories
    xvi. Cassette carriers (X- ray)
    xvii. Padded Lithotomy crutches with adjustable height (2 no.s)
    xviii. User/Technical/Maintenance manuals to be supplied in English.
    xix. Certificate of calibration and inspection.
    xx. List of Equipments available for providing calibration and routine Preventive

xxi. Maintenance Support. As per manufacturer documentation in service/technical manual.

xxii. List of important spare parts and accessories with their part number and costing.

xxiii. Log book with instruction for daily, weekly, monthly and quarterly maintenance checklist.

21. The unit shall be capable of being stored continuously in ambient temperature of 0 -50deg C and relative humidity of 15-90%
22. The unit shall be capable of operating continuously in ambient temperature of 10 – 40deg C and relative humidity of 15-90%
23. Power input should be 220-240VAC, 50Hz and should fitted with Indian plug
24. It should have Rechargeable batteries and Battery charger 230V
25. The table Shall comply with IEC 60601-2-16 SAFETY requirements of medical electric equipment

1.3. O T TABLE {ORTHOPAEDICS} MAJOR ITEM

1. It should have Five sections stainless steel mobile with divided leg section, general purpose operating table.
2. The table should be electrically operating (Actuator Driven)
3. It should have rechargeable battery.
4. The table should have wired remote control for all functions.
5. The table should be radio lucent ,C- arm compatible and suitable for fluoroscopy
6. The Mattress should be radio lucent and suitable for fluoroscopy
7. Antistatic foam mattress at least 4 cm should be there.
8. It should have Freely mobile table base immobilizer
9. There should be Stainless steel telescope ram with hydraulic min. height from 28” to 42”.
10. Single handle operated table positioning should be possible
11. The equipment must have warranty for 36 months from date of installation at site; CMC will follow after the warranty period is over.
12. The table should satisfy following

i. Trendelburg 30- 45 degree.

ii. Reverse 30-45 degree.
iii. Lateral 15-30 degree
iv Extension 15-30 degree
v Flexion 60 degree
vi Head section adjustment – 45 to + 30
vii Leg section adjustment 20 to 90
viii Convenient head and leg flap drop/detachable and interchangeable should be possible to make knee position for spine surgery.

ix. Full length under couch X-ray cassette loading tunnel

13. It should supplied with following essential accessories

a) Clamps, circular socket direst on - 04

b) Clamps circular socket rotary end on 02

c) Arm rest 02

d) Semi circular padded antiseptic ankle pillow width min 180mm ht 120

e) patient restraint strap 02

f) Wristlet with clamp 02

g) Sq arm table pad (for hand surgery) for use with image intensifier 02

h) Anaesthesia screen with sleeve (padded) wristlet velcro strap height adjustable 01

i) Head ring silicone adult 01

pediatric 01

j) Head ring antistatic foam padded.

k) Rack for accessories.

l) small silicon wedge

m) orthopedics attachments for tibial and femoral interlocking railing

n) knee support for arthoscopy

o) knee and foot rest with clamps for spinal surgery

p) Should arthroscopy plate with shaped Head rest.

1.4 OT LIGHT (MAJOR ITEM)

1 The light should comprise of 2 units,
   i. one major which should have output between 120 k lux and 160 k lux
   ii. one minor which should have output between 80 k lux and 100 k lux.
2 Each unit should have a central light bulb.
3 Should have a facility of continuous brightness adjustment.
4 Should be shadow free.
5 It should be multiple or single reflector Prismatic or Optical Block based system .
6 Should have provision of direct recording & display of operating field via an autofocus, motor driven zoom lens, with digital video camera with high definition resolution recordable on hard drive/ DVD/ Mini DV tapes. Preferably mounted into the sterilizeable handle.
7 All cables should be through the central supporting pillar/column of light.
8 Should have dichroic mirrors and KG type glass filter for better thermal filtration so that the light on the incident area is free from thermal properties and cold.
9 Bulbs should should be of standard Quartz Halogen 12/24 V ;50,75,100,150 Watts 2 pin base. Any fittings will not be considered. Non standard bulb with special f product which is using proprietary items such as bulbs with special pins or wings with clips or base should not be considered because of non-availability of such items in the market.
10 Changing of bulbs should be easy with no tools or with very simple tools like screw drivers only and bulb base mounting should be independent of the sterilizable handles.
11 Changing of bulbs should not take more than 3-5 minutes.
12 The increase in the ambient temp of the room with the lights on should not be more than 3-5 degrees centigrade.
13 The light should be easily maneuverable and should have a swivel radius of at least 150 cms and height adjustment of at least 100 cms

14 The optimum colour temperature of the light should be between 3400-4200 Kelvin, with colour rendering index of at least 90%

15 Each unit should provide a pre-focused beam of light with atleast 50 cms depth of field.

16 It should be a cool light and should not interfere with the laminar air flow system. The absorption of infrared radiation should be more than 95% and infrared radiation to feet at 100000 lux should be less than 35 w /sq metre

17 Each unit should have quartz halogen lamp of average life of 1000 hours

18 25 numbers of spare bulbs should be included

19 The light should have 360 degree turning radius with unbreakable head Glass.

20 Light should have battery back up automatic switch over facility

21 The handle should be Autoclavable & detachable.

22 Shall meet IEC-60601-1-2 :2001(Or Equivalent BIS) General Requirements of Safety for Electromagnetic Compatibility. Or should comply with 89/366/EEC; EMC-directive.

23 The unit shall be capable of being stored continuously in ambient temperature of 0 -50deg C and relative humidity of 15-90%

24 The unit shall be capable of operating continuously in ambient temperature of 10 -40deg C and relative humidity of 15-90%

25 It should be fitted with appropriate Indian plugs and sockets.

26 It should have Suitable Servo controlled Stabilizer

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27 It should conforms to standards for electrical safety IEC-60601-1 General Requirements

1.5 SHADOWLESS LAMP (PORTABLE) (MAJOR ITEM)

1 It should have single domes with intensity of at least between 80,000 - 100,000 lux at 1m

2 Colour temperature in the range 3400-4500 K.

3 Infra red and ultraviolet filters for reducing heat radiation.

4 360 deg rotations at each pivot axis and should be stable in any position.

5 It should have detachable & sterilizable handle for focusing lights.

6 Light field diameter should adjustable over a minimum range of 16 cm to 30 cm at 1m.

7 Working distance of light beam 70 cm to 140 cm. Light field diameter should be constant over this range.

8 Light intensity should be adjustable over a range of at least 50% to 100%.

9 Bulb life should be at least be 1000 hours.

10 The bulb should be a halogen bulb and should be locally available.

11 Power Requirements: Voltage 240 + /-20 volts & frequency 50Hz.

12 Appropriate power cord of sufficient length with a plug of appropriate rating for standard Indian electrical sockets.

13 It should supplied with following accessories

i. Detachable sterilizable focusing handles (2 Nos.).

ii. One set of Spare bulbs.

SCHEDULE 2 - BOYLE'S APPARATUS (MAJOR ITEM)

1. Boyle's Apparatus should have rigid steel structure with four anti-static castors wheels having front with brakes.
2. It should have Appro. (10") long rotating bobbin flow meters, (rotameters) with colour coded control knobs, calibrated in multiple scales for accurate reading.
3. It should have Oxygen (1st tube)-10 cc/mm to 3.5 liter/min
4. It should have Oxygen (2nd tube)- 3.5 liter/min to 10 liter/min
5. It should have Nitrous oxide (1st tube)- 200 cc/ min to 5 liter/min
6. It should have Nitrous oxide (2nd tube)- 5 liter / min to 12 liter/min
7. It should have Air-100 cc/min to 12 liter/min
8. It should have It should be Gas specific, gas blocks pin indexed yokes, two each for oxygen & nitrous oxide & one for air suitable for pin- indexed cylinder. The equipment shall also have attachment for connection of compressed air.
9. It should be fitted with pressure gauges 100 mm diameter mounted on O2 and N2O cylinder (2 each) for clear visibility.

10. It should have Vaporizer for ether, penlon type with graduated jar with mounted selectatec. There should be Temperature compensated vaporizer for halothane/isoflourine {optional}.
11. It should be fitted with regulators and non return cum pressure release valves for gases.
12. It should have Two Numbers oxygen pneumatic power outlets operating at 50 psi to operate ventilator.
13. It should have extended rear platform for mounting two nos. additional 10 litre water capacity cylinders.
14. It should have Patient circuit to include elephantine tubing reservoirs bag, connections for changeover from open to closed circuit and vice versa.
15. It should have Top tray for monitoring equipment
16. It should have Drawer for keeping instruments.
17. In other respects the equipment shall comply with IS-11378-1985.
18. It should have adjustable pressure limiting valve, breathing circuit pressure measuring device.
19. It should have a bag/ventilator selecting valve integrated onto the absorber.
20. It should be suitable to use low flow techniques - Facility to attach oxygen sensor.
21. It should have CO2 absorbent Dual chamber canister
22. It should have Automatic cutoff of nitrous oxide in case of oxygen supply {nitro lock system} falls.
23. It should have Pneumatic device with audible alarm mechanical (not electrical) when oxygen supply falls to 10-15 psi.
24. It should have Hypoxic safety device to ensure that the patient is never subjected to pure N2O in flow out doses (shall ensure protection against singular flow of N2O) until a minimum flow of 1 liter-1.5 liter oxygen released.
25. Unit shall incorporate optional oxygen analyzer (oxygen concentration level indicator).
26. The Regulator and Yoke should force with S.S fittings.
27. The machine should have 3 inlets for O2 and N2O
28. It should have 2 oxygen outlets {optional}
29. There should at least one operating pressure gauge for O2 and N2O separately.
30. The operating pressure should be 4.22 kgf/sq.cm +/-0.5%

31. There shall be provision of adequate supply of oxygen to the patient even if the flow meter knobs are fully turned off.
32. Unit shall conform to relevant safety standards and general safety standards as per IS-8607.

SCHEDULE 3. ELECTRO SURGERY UNIT (MAJOR ITEM)

1. Should be a microprocessor based electrosurgical generator.
2. Should have a built in electronic system for constant feedback from tissue to deliver constant power.
3. It should able to do Low voltage coagulation
4. It should be designed for all surgical procedure
5. It Should have at least three types of cut modes Low, Pure& Blend
6. It Should have four coagulation modes
7. It should have Optional spray coagulation mode and Vessel sealing system.
8. Should have user settle able auto stop mode for soft coagulation to prevent carbonization.
9. Should have both monopolar cut up to 300W and bipolar cut up 120 watt.
10. Should have user settable auto start and auto stop facility in bipolar coagulation with auto start delay of 0, 1 and 2 sec.
11. Should have programmable memory settings as well as some preset memory settings for various applications.
12. Should have safety features like leakage current, patient plate disconnection and continuous activation of the unit.
13. Maximum output should be 470-520 KHz sinusoid.
14. Power efficiency rating should be more than 96
15. Both Bipolar and Mono-polar can able to do.
16. The Mono-polar should have cutting, spray, desiccation and fulguration modes.
17. Under water facility (TURP Mode), ENDO Mode (Pulsed Cut & Coag). And Convection cooling system is desirable
17. Patient system should be guaranteed by Return Electrode Contact Quality Monitor System which should automatically switch off the unit together with audiovisual alarms in case of power supply disconnection of the plate in the event of wire break off or loose connection. If the plate is not installed underneath the patient or it has a crack in the system it should not work.
18. Machine should store last 10 errors for easy technical support.
19. Machine should auto store last set values on the front panel if unit is

switched off.

20. The machine should have class I safety features and confirm to IEC 301-1 standard with CF type of generator.
21. The machine should have CE mark.
22. The equipment must have warranty for 36 months from date of installation at site; CMC will follow after the warranty period is over.
23. Power input to be 180-270 V AC, 50-60 Hz as appropriate fitted with Indian plug.

25. Electrical safety conforms to standards for electrical safety IEC-60601-1 General Requirements Certified to be compliant with IEC 60601-2-2 Medical Electrical Equipment Part 2-2: Particular requirements for the safety of High Frequency Surgical Equipments
26. The machine should be supplied with the following

i. Electrosurgical generator

ii. Double pedal footswitch

iii. Silicon rubber re-usable patient plate

iv. Patient plate connecting cord.

v. Monopolar

1. push button reusable electrode handle
2. rhombic, reusable, straight knife electrode
3. reusable straight knife electrode blade
4. straight 4mm diameter Ball electrode
5. Needle electrode reusable straight

vi. Bipolar

a. Bipolar forceps St. 19.5 cm long blunt tip 1 mm

b. Bipolar forceps 11 cm angled blunt tip.

c. Bipolar Forceps angled tip 16.5

d. Bipolar Forceps Bayonet 19.5 m pointed.

e. Bipolar Forceps St. 11 cm blunt

f. Bipolar Forceps Bayonet 19.5 cm blunt tip 1 mm

g. Bipolar Forceps Bayonet 22.5 cm Blunt tip 1.2mm

h. 3mm cable for Bipolar Forceps.

vii. Trolley

viii. Voltage Stablizer.

SCHEDULE 4

4.1 MULTIPARAMETER MONITOR (MAJOR ITEM)

1. It should be Compact portable and suitable for all patient categories.
2. The following parameters can able to monitored: ECG, HR, Respiration rate, SpO2, NIBP and temperature
3. It should have colour TFT, at least 10.1 inch and above, 4-channel Display
4. Soft touch keys should be there for durable and easy to clean
5. The parameters with range which should able to measure by the machine is given below
   i. ECG : I, II, III
   ii. HR : approx 30 to 250 bpm <+/-3 bpm>
   iii. NIBP : approx 20 to 290 mmHg (systolic) <+/-1 mmHg>
   iv. SpO2 : approx 40 to 100 % <+/-1%>
   v. ECG Derived Respiration {EDR} : approx 6 to 180 bpm <+/-1 bpm>
   vi. Temperature: approx 10 to 45 degree Celsius < +/-0.1 degree Celsius>
6. There should be oscillometric step deflation type NIBP monitoring facility. It can be done both Manual automatic. And user can select initial inflation pressure.
7. Sweep should be 12.5, 25 or 50 mm/s
8. It should have user adjustable Sensitivity (amplitude) of all signals
9. It should have 1 mV Standardising voltage marker
10. It should have User preset of high/low alarms on all monitored parameters
11. Audio visual alarms should be there to indicate if measurements are outside preset range

12. There should be Silencing feature for audio alarms
13. It should have Trend display from 2 to 24 hours
14. There is a provision for RS232 serial data output (peripheral printer or network),for the analogue ECG output
15. There should be Defibrillator sync and protection
16. Provision for Pacemaker detection/rejection should be there
17. It should Display reports system errors, leads and sensors failure and built-in battery status
18. Unit can be mounted on standard bed/wall rail or mobile pole/stand
19. Automatic switch from mains to batteries is possible in case of power failure
20. Monitor should be constructed of durable shock proof plastic
21. It can able to operate Power requirements 220 V / 50 Hz (with adapter) or internal re-chargeable batteries (autonomy approx 3 hrs, automatic recharge)
22. It should have Battery backup of minimum 2 hrs.

4.2 DEFIBRILLATOR (MAJOR ITEM)

1. The Defibrillator should be Bi- Phasic, light weight and latest model
2. Should monitor vital parameters and display them
3. Should print the ECG on thermal recorders.
4. Should work on Manual and Automated External Defibrillation (AED) mode. Manual selection up to 270 J.
5. Should be capable of doing synchronized & a-synchronized cardio version
6. It can be operated from mains as well as battery
7. Should have defibrillator testing facility
8. Demonstration of the equipment is a must.
9. Should be a Low Energy Biphasic defibrillator monitor with Recorder, having capability to arrest all arrhythmia within a maximum energy of 360 Joules
10. Should monitor ECG through paddles, pads and monitoring electrodes and
11. Defibrillate through pads and paddles. Should have Automatic Lead switching to see patient ECG through paddles or leads

12. Should measure and compensate for chest impedance for a range of 25 to 150ohms
13. Should have a built in 50mm strip printer/ thermal recorder
14. Should have charging time of less than 3 seconds for maximum energy. Charging indicator should be there.
15. Should have bright electroluminescent display for viewing messages and ECG waveform of 4 seconds
16. Should have external & internal paddles with paddles contact indicator – for good paddle contact. Single Adult and pediatric paddles should be available.
17. Should have event summary facility for recording and printing at least 250 events and 50 waveforms.
18. Should have a battery capable of usage for at least 90minutes or 30 discharges.
19. Should be capable of printing Reports on Event summary, configuration, self test, battery capacity etc
20. Should have facility for self test/check before usage and set up function
21. Should have SP02 and NIBP integrated facility
22. Should be capable of delivering energy in increments of 1-2 joules up to 30J and increments of maximum 50J thereafter.
23. Should have user friendly 1,2,3 color-coded operation.
24. *System Configuration Accessories, spares and consumables*

    i. Defibrillator -01
    ii. Paddles Adult/Pediatric (pair) -01
    iii. Paddles –Internal (pair) -01
    iv. Patient cable -02
    v. ECG Rolls -50
    vi. Disposable pads -10 nos.
    vii. NIBP Cuff Adult - 02
    viii. NIBP Cuff Pediatrics - 02
    ix. NIBP Cuff Infants - 02
    x. Reusable SPO2 Finger Probe-Adult -02
    xi. Reusable SPO2 Pediatric Finger Probe - 02
    xii. Complete set of ECG Leads - 02

25. The unit shall be capable of operating continuously in ambient temperature of 10 -400 C and relative humidity of 15-90%
26. The unit shall be capable of being stored continuously in ambient temperature of 0 -500 C and relative humidity of 15-90%
27. Shall meet IEC-60601-1-2: 2001(Or Equivalent BIS) General Requirements of Safety for Electromagnetic Compatibility.
28. Power input to be 220-240VAC, 50Hz
29. Resettable over current breaker shall be fitted for protection
30. Electrical safety conforms to standards for electrical safety IEC-60601-1 General Requirements and IEC-60601-2-25 Safety of Electrocardiograms. (OR EQUIVALENT BIS Standard)
31. Drop Test-Withstands 1 meter drop to any edge, corner or surface.
32. Should conform to international test protocols on exposure to shock forces and to vibration forces. The standard should be documented.
33. Should meet IEC 529 Level-2 (IP2X) for enclosure protection solid foreign object ingress.
34. Should meet IEC 529 Level 3 (IP3X)(spraying water) for enclosure protection, water ingress.

SCHEDULE 5 - SYRINGE PUMP (MAJOR ITEM)

1. Pump must have all the necessary certifications, ISO 13485:2003/FDA/CE mark .
2. Pump system includes syringe, controls, actuation mechanism, and a motor. It should be able to accept all the major brand of syringes upto 60ml, without compromising on the accuracy.
3. Pumps must be stackable and mountable on the IV pole.
4. The controls must include the setting for the infusion rate in terms of ml/hr, and provision for the bolus delivery.
5. External feeding pumps if available should also be quoted.
6. Indicators and Alarms
    a. It should have a series of alarms and indicators that would inform the operator of the status of the infusion system that could be harmful to the patient.

b. Alarms must include
    i. air-in line alarm,
    ii. occlusion,
    iii. empty fluid container,
    iv. set disengagement,
    v. flow error,
    vi. low battery.

7. It must also be lightweight with a good battery support, and a memory to retain the settings in case of power failure.
8. It is also preferable to have a bi-directional interface port, RS232.
9. Should have spill proof joints and face board

SCHEDULE 6 –OPERATING MICROSCOPE (MAJOR ITEM)

1. It should have Five Step magnification changer integrated in microscope body with magnification factors 0.4, 0.6, 1.0, 1.6, 2.5.
2. It should have an Inclinable binocular tube 180º = 170 mm with P. D. adjustment via knob from 55 mm – 80 mm or more.
3. There must be 120 Degree coupling for rotation of microscope body about an inclined axes.
4. It should have 12.5 x wide field eye pieces (2x) with +/- power adjustment upto 6.0 D.
5. There should be Motorized foot control for fine focusing in the range 40mm.
6. It should be supplied with selectable Objective lenses having focal lengths f = 200, f = 300, f = 400.
7. Retina protection device must be there with the equipment.
8. It should have Floor Stand with lockable casters with Heavy Base.
9. It should have Spring Balance suspension arm.
10. Equipment should be up-gradable for CCTV and co – observer if required in future.
11. It should have U. V. filter to prevent Blue light.
12. It should have Motorized foot control X – Y coupling with automatic re centering facility.

13. It should have Illumination increase – decrease and on – off facility on foot control panel.
14. The machine should have cold light fibre optic illumination system 12V / 100W with Automatic bulb change over facility in case of lamp failure.

SCHEDULE 7

7.1 ELECTRICAL STERILISER

1. It should Confirming to IS Standards with latest amendments.
2. It should have electrically heated boiler, disinfections by boiling in antiseptic solution of surgical instruments, syringes/ glass & china ware.
3. It should have fully automatic temperature control by thermostat.
4. There should be a Single lever fitted of lid and tray.
5. It should be made of Stainless steel.
6. Manufacturer should able to ensure complete safety with cable, plug & socket and perforated try.
7. Unit filled with heat resistant wiring and thermal cut off.
8. All handles and grips shall be insulated.
9. It should fitted with drain out connection.
10. It can able to operate in 220-240 V AC, 50 Hz power supply.
11. Approx Size- usable Volume 15 liters or above
12. In addition to other instruments, the sterilizer shall also accommodate cheatle forceps.
13. Equipment must conform to relevant Electrical, safety and general standard for
14. Medical equipment as per IS standards
15. Unit should conform BIS or ISI or CE or FDA equivalent standards
16. Device is produced by ISO 9001 certified manufacturer

7.2 AUTOCLAVE HP {HORIZONTAL}

1. The autoclave shall confirm to IS: 3829-1978(part1) with at latest amendment.
2. The Autoclave shall be a horizontal cylindrical high-pressure sterilizers, Tripled walled with steam jacked and separate boiler.
3. The chamber Ring and back plate and steam generator shall be of stainless steel.
4. The jacket shall be insulated with asbestos sheet or glass wool to minimize the heat losses.

5. The sterilizer shall be provided with a pressure locking type safety door, which locks automatically as soon as the chamber is under pressure, unlocking only when the chamber is exhausted.

6. The sterilizer shall be provided with

   I. Multi part main operating valve to control the entire steam sterilization
   II. Pressure gauge for jacket
   III. Compound gauge for chamber
   IV. Plug screen
   V. Non-return valve
   VI. Safety valve
   VII. Power full ejector
   VIII. Self – sterilizing dries
   IX. Arrangement to avoid contaminated of sterilized load
   X. Vacuum breaker.
   XI. Pressure controlled switch
   XII. Automatic low level cutoff devices
   XIII. Operation Indicating lamp

7. The unit shall be mounted on aluminum enabled tubular steel frame with ground leveling screwed flanges
8. Unit design shall includes an airtight pressure proof seal/gasket
9. The equipment shall have a single piece door made of stainless steel. The jacket shall be made of heavy gauge stainless steel sheet with leak proof argon arc welding
10. All fitting shall be hard chromium plated
11. Heating element should be Flanged type immersion heating element made of high– grade material, shall confirm to IS: 4159-1983 with latest amendments or equivalent
13 The equipment shall ensure complete safety to the working personal against explosive openings.
14. Hydraulic test shall be done at 1.5 times the working of sterilizer chamber and 2 times of working pressure of jacket respective.
15. Operating pressure should be 16-18psi (adjustable) at a temperature of 120 degree centigrade and 30psi at 134 degree centigrade.
16. Desire pressure should be 2.2kg/Centimeter square.
17. Chamber size should be 500mm inner diameter X 900mm depth (approx)

18. Operating Voltage and power should be 400 to 440 VAC, 3 phase 50 Hz, 9 to

    18 KW.

19. There should be three numbers of stainless steel SS drums having size 350mm dia.X240mm depth .They should be confirm to IS 3831- 1979 specification.
20. It should have digital thermometer to show thermal temp & one no. thermo graph to record the sterilization temperature.
21. It should supply with the following
    i. Spares : Gasket (Silicon type) – 5
    ii. Glass tube – 2
    iii. Coil set- 6
    iv. Tool kit with suitable box spanner to remove/fix the coils –1
22 Equipment shall conform to relevant safety standard and general safety standards for medical equipment as per IS: 8607
23. Unit should conform BIS or ISI or CE or FDA equivalent standards.

7.3 AUTOCLAVE {VERTICAL}

1. It should be vertical type and capacity should be 90 liters
2. The inner chamber and lid should be made of stainless steel
3. It should have following
    i. Radial locking system
    ii. Pressure gauge
    iii. Thermometer
    iv. Safety valve
    v. Water level indicator
    vi. Stainless steel basket
    vii. Water outlet
    viii. Mains indicating lamp
    ix. Paddle lifting device
    x. Automatic low water cut-off device

4. Pressure should be 1 to 1.5 Kg/Sq.cm

5. Temperature should be 110 degree and 140 degree centigrade and adjustable in steps of 1 degree centigrade.
6. It should have a digital thermo meter with timer
7. It can able operate in 230V{+/- 10 V} 50 Hz Single Phase power supply
8. All mild steel sections shall be degreased ,derusted, phosphate and Powder coated
9. The apparatus should confirm to IS 14345:1996 with latest amendments or equivalent international standards covering Markings, Safety requirements with recommendations of safe operations

Schedule 8

8.1 -Two Plate X-Ray Viewing Screen (Size 948 x 648 mm) with variable intensity of Light control

1. A twin plate X-Ray Viewing Screen, designed to provide a high level of control
luminance, without flicker, from a unit that is easy to clean and maintain.
2. The X-Ray viewing screen illumination should be by high frequency fluorescent lamps, controlled by dimming ballast.
3. The front panel diffuser should be of a glare free type, sealed flush with the inside face of the operating theater wall (or may as an option be integrated within the control panel fascia).
4. It should be equipped with eight spring-loaded clips to secure the X-ray negative when in use. The fluorescent lamps should provide a uniform level of illumination across the entire front panel diffuser and should be controlled by an electronic step-less dimming controls to provide flicker free dimming from maximum brightness to off.
5. Access for maintenance and lamp charging should be from the front of the panel.
All internal wiring should terminate in connectors with screw and clamp spring connections. Individual fuses or miniature circuit breakers should protect all internal circuits, all internal wiring should be of a high temperature and secured
by propriety cable clips.

8.2 SUCTION APPARATUS

1. Shall have Motor of minimum ¼ H.P. capacity
2. The machine should be portable on four wheels and handle for transportation
3. The Suction pump should be oil immersed fitted on Motor shaft
4. Suction pump should have line grinding internally.

5. To facilitate maintenance the cover of machine should be easily to open from the top & sides
6. The suction machine should be capable of producing minimum vacuum of 500 approx mm Hg. which should be adjustable and monitored by vacuum gauge of suitable range.
7. The suction capacity should be 15 litres per minute and can be regulated.
8. It should have two bottles of 1 or 2 liters (As per requirement) with synthetic rubber lids. The bottle shall be fitted with the arrangement to prevent overflow of fluid.
9. ON/OFF Switch and Power indicator should be available
10. The Base, top & panel made of rust proof and corrosion resistant moulded ABS/Stainless Steel.
11. Jar/Bottle material should be autoclavable polycarbonate.
12. It should have Inbuilt maintenance free battery. Battery backup up to 60 minutes on full charge. Provided with cable for ambulance/car use.
13. *System should supplied with following Accessories, spares and consumables*

    i. System as specified
    ii. .Three core lead of 2 meter along with one 3 pins 15 amp. Plug 01
    iii. Power cable-3 core lead of 5 meter along with one 3 pins 15 amp. Plug 01
    iv. Bottles 2 Nos.
    v. Lids 2 Nos.
    vi. Rubber Seals 2 Nos.
    vii. Blades 2 Nos.
    viii. Suction Tubing set 1 No

14. Shall meet IEC-60601-1-2: 2001(Or Equivalent BIS) General Requirements of Safety for Electromagnetic Compatibility or should comply with 89/366/EEC, EMC directive.
15. The unit shall be capable of being stored continuously in ambient temperature of 0 -50deg C and relative humidity of 15-90%
16. The unit shall be capable of operating continuously in ambient temperature of 10 -40deg C and relative humidity of 15-90%

17. Power input to be 220-240VAC, 50Hz fitted with Indian plug
18. A fuse or a resettable circuit breaker of a appropriate capacity should be incorporated for protection of motor
19. Should work on 220-240V AC as well as batteries. Mains adaptor to be supplied
20. Should be FDA, CE, or Equivalent approved product
21. Conforms to BIS standard for suction apparatus IS- 4533, Latest Revision except where specified here differently
22. Manufacturer/Supplier should have ISO certification for quality standards.

8.3 SUCTION APPARATUS { FOOT OPERATING}

1. High vacuum suction unit run on manual (foot)
2. With two suction jars of approx 1 and 1 liters capacity each.
3. Auto cut off device for preventing entry of fluid in pump.
4. Fast and efficient jar change facility.
5. Easy access and control
6. It should be portable
7. Should be able to create desired maximum vacuum in- least possible time.
8. One plastic suction jar cover, steam sterilisable to be provided extra.
9. Two extra suction jars (Plastic) of capacity 1 and 1 liters should be quoted with accessories like lid, tubing etc.
10. It should confirm to BIS standard for suction apparatus IS- 4533.

Schedule 9 - Electronic Tourniquet (Ortho) (Major Item)

1. It should be a Dual cuff tourniquet.
2. It should supplied with 2 sets of cuffs, five sized each (total 10 cuffs) for dual application.
3. It should be Light weight, battery backup, alarms controls and display.
4. It should satisfy following

   i. Cuff pressure range -10 to 450 mm Hg.
   ii. Pressure regulation + and 10 mm Hg of set point.

iii. On line setting – allow on light increase and decrease of set pressure.
iv. Timer – can be set from 9 hours and 59 minutes.
v. Timer least count – 1 minute.
vi. Internal least count – 1 milli second.
vii. Alarm – guides audile alarm on timer reaching set value.
viii. Quick release – pressure is released from the cuff without affecting the timer.
ix. Memory function – pressure set in earlier is stored and displayed when needed.
x. Power supply – 230 V, AC 50 Hz.
xi. Can also work on generator and dose not require stabilizer.
xii. Warranty – 01 year including cuffs.
xiii. Autocavable cuff – large , big, medium small and paedtric.

5. It should supplied with the following Accessories

i. cuff with sleeve all sizes.
ii. Dual cuff in all sizes.
iii. Positive locking connectors with angled ports.
iv. Cuff hose.
v. Tourniquent stand.
vi. Basket for accessories.
vii. Carrying case for tournequett and cuffs.

Schedule 10 -MOBILE C-ARM IMAGE INTENSIFIER (Major Item)

I.It should be mobile and should have emergency break.

II.It should satisfy the following

1.Generator
Microprocessor controlled High Frequency generator with 2.5Kw or More with integrated beam filters to reduce patient skin radiation dose

2.Collimator: IRIS or multi leaf

3.X Ray mode (kV & mA range):KV- range 40- 110KV

4.Fluoroscopy
a)Fluoroscopy should not exceed 5 mA .
b) Pulsed Fluoroscopy with last Image Hold

5.Radiography –
Radiographic mode for cassette exposures: minimum of 20mA

6.Image Intensifier:
9”or More Triple Mode Image Intensifier with CCD Camera

7.Image Processing:
a) Minimum 12 bit Digital Fluoroscopy Imaging Unit with dedicated video pipe-line processor
b) Archival memory CD/DVD mode.
c) Detachable Cassette holder for film recording.

8.Image Display:
Two 19” TFT/ LCD High resolution, high contrast and flicker free Monochrome Monitors of at least 1024 X 1024 matrix with automatic adaptation of monitor brightness to ambient light

9.System Functionality:

Vertical ,Horizontal and Orbital Travel should be available

C arm rotation 135 degree or more.The System should be DICOM ready

10.Accessories:

A) Wrap around light weight vinyl Lead Aprons with 0.5 mm lead equivalence certified by BARC or AERB .At least two{2} numbers should be there.)