

**MINISTRY OF HEALTH & FAMILY WELFARE  
(GOVT. OF INDIA)**

**ALL INDIA INSTITUTE OF AYURVEDA (AIIA), NEW DELHI**

**Tender**

**for**

**Supply, Installation, Testing & Commissioning of Bio Medical  
Waste Management System at All India Institute of Ayurveda  
(AIIA), Sarita Vihar, New Delhi**

**VOLUME – III**

**TECHNICAL SPECIFICATION**

**November 2013**



( Consultants & Engineers for Mega Hospitals & Laboratories )  
E - 6 (A), Sector - I, NOIDA ( U.P. ) - 201 301 ( INDIA )

PHONE : 91-2542436, 2542440      FAX : 91-11-91-2542447  
91-2542443, 2542445      E- mail : [www.hsccltd.co.in](http://www.hsccltd.co.in)

**Tender No. HSCC/SES/AIIA/BMWS/2013**

## **TECHNICAL SPECIFICATIONS OF BIO-MEDICAL WASTE MANAGEMENT SYSTEM**

**SCOPE OF WORK** Supply, installation, testing and commissioning and handover of complete Bio-Medical Waste Management System to hospital including all accessories and auxiliary items in accordance with the specifications, bill of quantities including Turnkey work and providing of free spare parts and service during 2 year Defect Liability Period.

### **1. Bio-Medical Waste Autoclave**

Horizontal Cylindrical High Pressure Steam Sterilizer BIS Marked IS: 3829 (Part 1)

Horizontal Cylindrical High Pressure Steam Sterilizer, manufactured as per BIS Specification No. IS 3829 (Part 1)-1978, with the latest amendments and bearing ISI Mark IS: 3829 (Part 1).

The Sterilizer should be capable of autoclaving the following categories:

Waste sharp, needles and broken ampoules  
Highly infectious waste, blood bags, lab culture, bio-technology waste.  
Isolate waste.  
Discarded Glassware (Broken syringes)  
Soiled waste, infected cotton, swab pieces.

- **Capacity: Size- 450x450x900 mm**
- Mode of Heating: Electrically heated by immersion heaters wired for operation on 3-phase 4-wire, 400/440 volts 50 Hz A.C. Supply.
- Working pressure: 20 Lbs/Sq.Inch. 1.26 kgf/cm<sup>2</sup>.
- Operating Pressure: 1.05 + 0.15 kgf/cm<sup>2</sup> approx. (20 psi).
- Operating Temperature: about 110 & 121 degrees centigrade.
- Exhaust: Fast Exhaust within 7 minutes & slow exhaust from 7 to 30 minutes.
- Hydrostatic Test: The shell is subject to hydrostatic test to twice the working pressure.
- Performance: The sterilizer shall be capable of performing the following operations constituting one full cycle of sterilization.
- Generate steam and build up working pressure in the jacket, without admitting it to the chamber:
- Admit steam to the chamber and allow it to build up to working pressure and temperature.(maintaining pressure in the jacket) and retaining working temperature for at least 2 hours;
- Exhausting the chamber pressure, retaining the jacket pressure; and

- Drying of load in chamber (if required) through the circulation of dry filtered air entering through a drying system.
- Dished Door: Fitted with one dished door SS-316 and brass Hinges, with SS radial arms to manipulate smoothly by well-insulated handles, and shall have gunmetal Door Locking assembly & automatic pressure locking device to provide complete safety to the operating personnel against any explosive opening of the door under high pressure. Provision is made to tighten the dished door while in locked position. A molded steam and heat resisting silicone joint less gasket shall be fitted to the door.

### **Material of Construction:**

- Chamber & Back Plate: SS sheet of grade (04Cr18Ni10) 316 non-magnetic-10 SWG.
- Jacket: SS sheet of grade (04Cr18Ni10) 304 non-magnetic – 12 SWG.
- End Ring: SS 304 non-magnetic – 10 mm.
- Connections & Piping: Made of Stainless Steel having bright finish.
- Dished Door: Stainless Steel 16 mm thick.
- Outer cover: SS sheet 304 Quality.
- Operating Valve: To Control the cycle of sterilization as per ISI standards.
- Safety Valve: As a pressure switch for controlling pressure is provided on jacket, spring-loaded safety valve is provided to jacket as a safe guard against excess pressure in the jacket.
- Ejector: A powerful ejector system to create partial vacuum, which shall help in quick drying.
- Drying System (Vacuum): With Bacteria Filter allows dry filtered hot air into the chamber during drying cycles.
- Vacuum Breaker: Prevents formation of accidental vacuum in jacket due to steam condensation.
- Plug Screen: Fitted in Chamber, prevents the Chamber from clogging with lint and sediment.
- Dial Thermometer: Indicates the working temperature in the Chamber accurately.
- Pressure Gauge: Indicates the pressure of steam in the jacket.
- Compound Gauge: Indicates the vacuum and pressure in the chamber.
- A Pocket (For Thermograph): The provision to fit the bulb for the temperature recorder.
- Steam Trap and Check Valve: Fitted into the discharge line for automatic removal of residual air and condensate to give optimum sterilization temperature.
- Boiler (Steam Generator): Fitted to underside of shell. Boiler shall be fitted with:
  - Immersion type heating elements 9kw Load.
  - A low water protection for heaters provided to cut off electricity supply to heaters through a float level switch and magnetic air break contactor if the water level runs below heater level. Feed water System to feed water in to the Boiler as and when water level goes down.

- Water level gauge glass indicates level in boiler (capable of self-locking in case of breakage).
- Water inlet with non-return valve and drain valve etc.
- Pressure controls switch to control and keep pressure constant in the jacket.
- Boilerplate of Stainless Steel AISI-316 (10/12mm thick) & Nuts and bolts shall be of stainless steel.
- An extra pressure gauge and safety valve is provided in the boiler.
- In addition, equipped with Toggle Switch and indicating red & green Lamps.
- Tray (Stainless Steel): Provided in the Chamber of suitable size.
- The whole unit shall be mounted on a tubular pipe stand duly painted with best heat resisting paint.
- The unit shall be made as per I.S.I. Specification No. IS:3829 (Part 1) and bear I.S.I. Mark IS 3829 (Part 1).
- **Secondary Sterilization system should be incorporated with the Waste Autoclave for sterilization of infected steam condensate of the Waste Autoclave.**

#### **Accessories:**

- Audio Visual Alarm with Timer.
- Thermograph with 500 recording charts.
- Rack with Trays complete SS-316.
- Digital Temperature Controller with probe.
- Digital temperature indicator with 2 temperature probes.
- Water Softener Plant.
- Additional manual arrangement for filling Boiler with solution to de-scale boiler.

## **2. Medical Waste Shredder (Low Speed)**

- Should be of robust design with minimum maintenance requirement.
- Should be properly designed and covered to avoid spillage and dust generation. It should be designed such that it has minimum manual handling.
- The hopper and cutting chamber of the shredder should be so designed to accommodate the waste bag full of biomedical waste.
- The shredder blade should be highly resistant and should be able to shred waste sharps, syringes, scalpels, glass vials, blades, plastics, catheters, broken ampoules, intravenous sets/ bottles, blood bags, gloves, bandages etc. It should be able to handle/ shred wet waste, especially after microwave/ autoclave/ hydroclave.
- The shredder blade should be of non- corrosive and hardened steel.

- The shredder should be so designed and mounted so as not to generate high noise & vibration.
- If hopper lid or door of collection box is opened, the shredder should stop automatically for safety of operator.
- In case of shock- loading (non- shred able material in the hopper ), there should be a mechanism to automatically stop the shredder to avoid any emergency/ accident.
- In case of overload or jamming, the shredder should have mechanism of reverse motion of shaft to avoid any emergency/ accident.
- The motor should be connected to the shredder shaft through a gear mechanism, to ensure low rpm and safety.
- The unit should be suitably designed for operator safety, mechanical as well as electrical.
- The shredder should have low rotational speed (maximum 50 rpm). This will ensure better gripping and cutting of the biomedical waste.
- The discharge height (from discharge point to ground level) should be sufficient (minimum 3 feet) to accommodate the containers for collection of shredded material. This would avoid spillage of shredded material.
- The minimum capacity of the motor attached with the shredder should be adequate enough for carrying out for more than 25Kg/hr, and should be three phase induction motor. This would ensure efficient cutting of the bio-medical waste as prescribed in the bio- medical waste (Management & handling) Rules.

### **3. Needle destroyer**

- Should incinerate the needle using low voltage electrical current.
- It should reach a temperature of 1600-1700°C to turn the needle into ash.
- The process should be rapid taking 1-2 seconds
- There should be no visible sparking or arcing
- After incineration the needle debris should be contained in a built in receptacle/container which may be disposable or reusable
- Should have a cutter to cut the nozzle of the syringe with minimal agitation
- Should destroy or deform the needle and syringe by mechanical means
- The cutting blades should be of the best quality

### **4. Transportation Trolley**

- The container should be made of sturdy plastic material resistant to acid, alkali and chemicals.
- Should be designed and constructed so that they do not have sharp edges.

- Container must be detachable and there must be provision for washing the container
- Should be easy to clean, disinfect and drain.
- Should be covered with a sturdy plastic lid attached with hinges and latch facilities so that biomedical waste bags are not exposed to environment.
- Iron body frame of trolley MS iron i.e. angle iron 25 mm by 25 mm and 3 mm in thickness.
- Should be able to contain any leakage from the damaged containers.
- The waste should be easily loaded, secured and unloaded.
- Should have suitable capacity each.
- Should be color coded yellow/blue/white/black and have biohazard sign and name of the hospital.
- Should have four wheel drives, two wheel movable and two fixed. Should be rubber bounded to cast iron long life, high load capacity and road grip size 6 inch with sealed ball bearing.
- Should have wheel locks to prevent the wheel barrow from rolling on its own.

**5. IN ADDITION TO THE ABOVE, FOLLOWING TURNKEY WORKS FOR INSTALLATION AND COMMISSIONING OF BMW AT ALL INDIA INSTITUTE OF AYURVED, SARITA VIHAR, NEWDELHI ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR :**

- Additional work pertaining to Civil, Electrical, Requisite Furniture for office and BW System, Plumbing, Overhead Water Tank, Sanitary, Servo stabilizers/U.P.S etc. and any other protections relevant as per State/Central Govt. regulation/local authority/NDMC, required for successful installation testing and commissioning of the system and the offered price should include all such costs, each Schedule is to be considered a package in itself and contractor to execute the order in package on a “turnkey basis”.
- Installation and commissioning of **Electric distribution panel** with all switchgears, wiring and controls etc of L&T/ Siemens/ ABB/GE or Schneider make ) for distribution of power supply to various load points in the BMW Room from single point power supply(Provided by the hospital).
- Providing fixing of **Electrical Gadgets** like ELCB, MCB, Light Points, Power points, Fans, Cool air Fans, Exhaust fan etc in the BMW room. Number of fans, power point, bulbs/tube light. Apart from these supplies to the individual equipments with ELCB & MCB in the BMW room. Installation of MCB, ACB, ELCB & OCB of Havell/Siemens/L&T/Schneider etc for Control Panel for BMW.
- **Electrical cabling** of IS: 1554 standard and wiring as per IS : 732 standard and of adequate capacity to bear total electrical load required for BMW works from **nearby MDB/Substation in the hospital** to the Electric Distributional Panel(EDP) of BioMedical waste room and from the EDP to the corresponding load points.

- Laying of **GI water pipe line** with necessary taps, joints, elbows, Unions, Tees and valves of GI made and IS-1239 standard (Latest version) and of adequate sizes to feed total water requirement of the BMWMS from the available source point in the hospital to the overhead tank and from the overhead tank to the installed machines'/users' ends at BW Room.
- Construction/laying of **Draining system with Grating** from all the equipments/Sinks to the main drain (outside the BMW) with proper trap and flow system and tapping.
- **Ventilation** with installation of Industrial Blowers/Blowers is the responsibility of the contractor. Motor shall be of suitable capacity, continuous duty S1 type of IS : 325 standard (Latest version) and of Kirloskar/NGEF/Siemens/ABB/GEC/Crompton Greaves make.
- Arrangement for requisite **Fire Fighting** for the entire effective zones in the BMW Room

**In addition to the above mentioned equipment/appliances**, if the contractor thinks it necessary to include any other equipment/appliances, accessories etc. for the BMWMS then that may be provided after approval from Engineer in-charge.

The sizes are approximate. Minor variations in sizes shall be acceptable subject to prior approval of the Engineer.

**APPROVED MAKES :**

1.	Air Blower	SWAM/ EVEREST/ KAY/Beta
2.	Blower Motor	KIRLOSKAR/ NGEF/ SIEMENS/ CROMPTON/ ABB
4.	Cable	SKYTONE/KEI/UNIVERSAL/NATIONAL/RR CABLE
6.	Aeration System	NORTON/ UEM/ V.K.ENVIROTECH/MM AQUA
8.	Butter Fly Valve	AUDCO/ KEYSTONE/ KSB/ CRI
9.	Control Panel	L & T/ SIEMENS/ SCHNEIDER
10.	Valve	LEADER/ ZOLOTO / CRI
11.	PVC Pipe Class III with Fitting	FINOLEX/ SUPREME/ PRINCE/ ORI-PLAST
12.	G.I. / M.S. Pipe Heavy Class	TATA/ JINDAL(HISSAR)/ SAIL / SURYA PRAKASH
19.	MCCB/ Contactor/ Relay	L&T/ ABB/ SIEMENS/ SCHNEIDER
20.	Pressure Gauges	H.GURU / FIEBIG
21.	Stainless Steel	TATA/ SALEM/ JINDAL/ MUKUND/ BHAYANDER/ AMBICA

**Note :**

- **The bidder should attach Technical Compliance item wise with respect to the above technical specifications and turnkey work along with Printed catalogues**
- **The contractor shall be responsible for the complete works including submission of working drawing and walk through view.**
- **The contractor should provide complete List of Commonly used Spares, Operation manual, Equipment manual, Service manual and manuals for all systems and subsystems.**
- **Final electrical and pressure and other safety test, system test and calibration should be done by authorized person with test instruments.**
- **The contractor should provide all electrical accessories like cable wire, electrical outlets, switches etc, and they should be fire proof of reputed make, certified for electrical safety.**
- **Wherever makes have not been specified for certain items, the contractor should provide the same as per BIS and as per approval of HSCC.**
- **Training of personnel of the Institute should be 7 days at least by the contractor.**
- **The contractor should prepare and submit layout plan for Steam Pipeline, Electrical Wiring, Electrical Distributional Panel, Plumbing, Fire Fighting System, Air Washing and Ventilation and Drain line to HSCC for approval before beginning of supply and installation and As built drawing after installation.**
- **The contractor should provide test certificate for all materials along with manufacturer's test certificate and equipments used for BMW.**