

Introduction:

A dedicated waste treatment of infectious and bio-hazardous solid waste using an environmental safe technology is required for a 400 beds hospital , where the waste at the end of treatment process must demonstrate the following characteristics as per international codes and standards:-

- 1- Safe waste , not infectious and not hazardous
- 2- Waste are unrecognizable
- 3- No sharps or dangerous waste residuals
- 4- Dry
- 5- Microbial reduction up to 6 log10 or better independent on waste volume configuration.

Volume of treatment :-

The required volume is approx. 100 KG/h

Waste composition :-

System should be able to handle needles, cannulas, syringes, blades, surgical instruments, IV sets , blood bags (empty, residual or full), gloves, gauze, blasters, dressings, catheters, drapes, textile, filters, plastics, metal, debris, urinals, bedpans, dialyzers, suction bottles and suction tubes, cables, electrodes, paper, wooden, glass, autopsy residuals, lab culture, stocks, tubes, petri dishes, cotton, breathing sets, masks, gowns, , boots, operating shoes,mainly all solid waste classified as infectious or get in contact with patients blood or body fluids, all residuals of surgery.

Treatment technology :-

Treatment must be done using the technology of simultaneous shredding autoclaving technology, shredding and sterilization must be done inside one chamber in closed environment.

Treatment temperature must be 134 degrees with pre heating and post cooling. The waste output must respect the characteristics of waste specified above concerning microbial reduction, volume reduction and other mentioned characteristics.

No use of chemicals or special bags

The chamber must be provided with full jacket to enable perfect pre heating and post cooling and the material of the full jacket must be the same material like chamber material.

The waste treatment unit must be installed between two zones Dirty and clean zone, the waste loading will be from dirty zone while the treated waste must be exported out from the clean zone, the dirty zone and clean zone must be physically and microbiologically separated to prevent cross contamination between dirty and clean waste.

Specifications :-

- Pass through system
- Built-in elevator for waste loading
- Pressure vessel composed of treatment chamber and full jacket must be made of high quality material that can resist any aggressive chemicals vapors or corrosion not less than AISI 316 Ti
- The machine frame and external panels must be made in stainless steel
- All pipes inside , valves , safety release valve must be made in stainless steel 316L
- Built-in steam generator with stainless steel heating elements, water level detector, safety release valve .
- Built-in vacuum pump that is cooled with no water consumption.
- Built-in air input filter hepa type filter class D13

- Built-in air exhaust filter heap type class D14 with sterilization in-line complete with integrity check
- Condensate water drainage treatment using vaporization device to avoid the drop of infectious condensate into the sanitary network
- Shredder must be made of solid type shafts with capability of shredding all materials of metals, wooden, plastics, textile, paper, ...made of high quality material stronger in cutting than metals with low maintenance.
- Programmable cycles.
- Built-in printer for cycle recording with print out of date and time, cycle, parameters, alarms if any happen during cycle and cycle result as valid or invalid.
- Biological indicator holder
- Vacuum leak test cycle
- All needed accessories for full functionally and complete installation
- Air compressor to be included
- Water treatment to be included
- Working hours for shredder for replacement or repair to be mentioned.
- Any consumables exclude water and electrical consumables to be mentioned.
- Water consumption per cycle to be indicated as L/cycle - Electric consumption per cycle to be indicated as KVA - Site drawings to be provided.

Accessories :-

The following accessories to be offered according to the waste treatment plant size. Hospital size is 400 beds.

- Manual washing disinfection gun
- Automatic cart washer
- Carts for collection and discharge of debris/ rubbish.

Extra sets :-

The following extra sets must be offered with every unit to include shredding kits, heating elements, exhaust filters, biological indicators, waste bags, chemical indicators, door gaskets, etc...

Services & installation tests :-

- Training inside the hospital for hospital nurses and cleaning staff on waste segregation at the point of generation and color coding waste bags.
- Training for waste treatment plant on safety standards, SOP, waste handling, waste treatment, operational of unit, quality assurance.
- Installation , commissioning and validation respecting IQ protocol.
- Spare parts availability for 10 years with spare parts list prices valid for 5 years.
- Environment test after installation to guarantee safety of environment.
- Humidity test to guarantee dryness efficiency.
- Biological test to guarantee microbial reduction of $6\log_{10}$ - Volume reduction test .