SCHEDULE I
(See Rule 5)

CATEGORIES OF BIO-MEDICAL WASTE

Waste Category No.	Waste Category (Type)	Treatment and Disposal [Option +]
Category No.1	**Human Anatomical Waste** (human tissues, organs, body parts)	Incineration @/deep burial*
Category No.2	**Animal Waste** (animal tissues, organs, body parts carcasses, bleeding parts, fluid, blood and experimental animals used in research, waste generated by veterinary hospitals, colleges, discharge from hospitals, animal houses)	Incineration @/deep burial*
Category No.3	**Microbiology and Biotechnology Wastes** (Wastes from laboratory cultures, stocks or specimens of micro-organisms live or attenuated vaccines, human and animal cell culture used in research and infectious agents from research and industrial laboratories, wastes from production of biologicals, toxins, dishes and devices used for transfer of cultures)	Local autoclaving/ micro-waving/incineration@
Category No.4	**Waste sharps** (Needles, syringes, scalpels, blades, glass, etc. that may cause puncture and cuts. This includes both used and unused sharps)	Disinfection (chemical treatment @@/autoclaving/microwaving and mutilation/shredding##
Category No.5	**Discarded Medicines and Cytotoxic drugs** (wastes comprising of outdated, contaminated and discarded medicines)	incineration@/destruction and drugs disposal in secured landfills
Category No.6	**(Soiled) Waste** (Items contaminated with blood, and body fluids including cotton, dressings, soiled plaster casts, lines beddings, other material contaminated with blood)	incineration@ autoclaving/microwaving

Waste Category No.	Waste Category (Type)	Treatment and Disposal [Option +]
Category No.7	**Solid Waste** (Wastes generated from disposable items other than the waste [sharps] such as tubings, catheters, intravenous sets etc.)	Disinfection by chemical treatment @@ autoclaving/microwaving and mutilation/shredding##
Category No.8	**Liquid Waste** (waste generated from laboratory and washing, cleaning, housekeeping and disinfecting activities)	Disinfection by chemical treatment and discharge into drains.
Category No.9	**Incineration Ash** (ash from incineration of any bio-medical waste)	Disposal into municipal landfill
Category No.10	**Chemical Waste** (Chemicals used in production of biomedicals, chemicals used in disinfection, as insecticides etc.)	Chemical treatment @@ and discharge into drains for liquids and secured landfill for solids

@@ Chemicals treatment using at least 1% hypochlorite solution or any other equivalent chemical reagent. It must be ensured that chemical treatment ensures disinfection.

Mutilation/shredding must be such so as to prevent unauthorized reuse.

@ There will be no chemical pretreatment before incineration. Chlorinated plastics shall not be incinerated.

* Deep burial shall be an option available only in towns with population less than five lakhs and in rural areas.

[+ Option given above are based on available technologies. Occupier/operator wishing to use other State-of-the-art technologies shall approach the Central Pollution Control Board to get the standards laid down to enable the prescribed authority to consider grant of authorization]

SCHEDULE II
(see Rule 6)

COLOUR CODING AND TYPE OF CONTAINER FOR DISPOSAL OF BIO-MEDICAL WASTES

As per the Rules the wastes coming **under ten categories** are to be placed in **four different coloured containers/ bags**. The wastes have to be treated using techniques such as deep burial, incineration, autoclaving, micro waving, mutilation, shredding and chemical disinfection.

YELLOW:
Human Anatomical Waste, Animal Waste Microbiology & Biotechnology Waste, Wastes from the laboratory cultures etc and Soiled Wastes e.g. Cotton, Bandages, items contaminated with blood and body fluid

RED*:*
Solid Waste-Infected Plastics Wastes generated from disposable items other than the waste sharps such as tubing, catheters, intravenous sets, plastic syringes, etc.

BLUE:
Blue/ White Puncture Proof container waste sharps-needles, scalpels, blades, glass, etc. that may cause puncture and cuts. This includes both used and unused sharps

Black:
Discarded Medicines, Cytotoxic Drugs are to be stored at black dustbins.

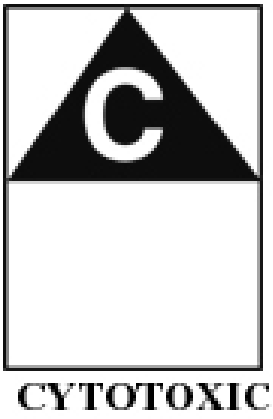
Never throw any Non-Infectious wastes in the bins meant for Bio Medical Wastes. Non Infectious wastes can be kept in Green Dust Bins.

SCHEDULE III
(see Rule 6)

LABEL FOR BIO-MEDICAL WASTE CONTAINERS/BAGS

BIOHAZARD SYMBOL

CYTOTOXIC HAZARD SYMBOL



HANDLE WITH CARE

Note: Label shall be non-washable and prominently visible.

SCHEDULE V

(see Rule 5 and Schedule I)

STANDARDS FOR TREATMENT AND DISPOSAL OF BIO-MEDICAL WASTES

STANDARDS FOR INCINERATORS:

All incinerators shall meet the following operating and emission standards:

A. Operating Standards

1. Combustion efficiency (CE) shall be at least 99.00%.
2. The Combustion efficiency is computed as follows :

$$C.E. = \frac{\%CO_2}{\%CO_2 + \%CO} \times 100$$

3. The temperature of the primary chamber shall be 800 ± 50c^{o}.
4. The secondary chamber gas residence time shall be at least 1 (one) second at 1050 ± 50c^{o}, with minimum 3% Oxygen in the stack gas.

B. Emission Standards

Parameters	Concentration mg/Nm^3 at (12% CO_2 correction)
(1) Particulate matter	150
(2) Nitrogen Oxides	450
(3) HCl	50

(4) Minimum stack height shall be 30 metres above ground.

(5) Volatile organic compounds in ash shall not be more than 0.01%.

Note:

- Suitably designed pollution control devices should be installed/retrofitted with the incinerator to achieve the above emission limits, if necessary.
- Wastes to be incinerated shall not be chemically treated with any chlorinated disinfectants.
- Chlorinated plastics shall not be incinerated.
- Toxic metals in incineration ash shall be limited within the regulatory quantities as defined under the Hazardous Waste (Management and Handling) Rules, 1989.
- Only low sulphur fuel like L.D.O./L.S.H.S./Diesel shall be used as fuel in the incinerator.

STANDARDS FOR WASTE AUTOCLAVING:

The autoclave should be dedicated for the purposes of disinfecting and treating bio-medical waste,

(I) When operating a gravity flow autoclave, medical waste shall be subjected to :

(i) a temperature of not less than 121^{o}C and pressure of 15 pounds per square inch (psi) for an autoclave residence time of not less than 60 minutes; or

(ii) a temperature of not less than 135^{o}C and a pressure of 31 psi for an autoclave residence time of not less than 45 minutes; or

(iii) a temperature of not less than 149^{o}C and a pressure of 52 psi for an autoclave residence time of not less than 30 minutes.

(II) When operating a vacuum autoclave, medical waste shall be subjected to a minimum of one pre-vacuum pulse to purge the autoclave of all air. The waste shall be subjected to the following:

(i) a temperature of not less than 121°C and pressure of 15 psi per an autoclave residence time of not less than 45 minutes ; or

(ii) a temperature of not less than 135°C and a pressure of 31 psi for an autoclave residence time of not less than 30 minutes;

(III) Medical waste shall not be considered properly treated unless the time, temperature and pressure indicators indicate that the required time, temperature and pressure were reached during the autoclave process. If for any reasons, time temperature or pressure indicator indicates that the required temperature, pressure or residence time was not reached , the entire load of medical waste must be autoclaved again until the proper temperature, pressure and residence time were achieved.

(IV) **Recording of operational parameters**

Each autoclave shall have graphic or computer recording devices which will automatically and continuously monitor and record dates, time of day, load identification number and operating parameters throughout the entire length of the autoclave cycle.

(V) **Validation test**

Spore testing:

The autoclave should completely and consistently kill approved biological indicator at the maximum design capacity of each autoclave unit. Biological indicator for autoclave shall be Bacillus stearothermophilus spores using vials or spore strips, with at least $1x10^4$ spores per millilitre. Under no circumstances will an autoclave have minimum operating parameters less than a residence time of 30 minutes, regardless of temperature and pressure, a temperature less than 121°C or a pressure less than 15 psi.

(VI) **Routine Test**

A chemical indicator strip/tape that changes colour when a certain temperature is reached can be used to verify that a specific temperature has been achieved. It may be necessary to use more than one strip one strip over the waste package at different location to ensure that the inner content of the package has been adequately autoclaved.

STANDARDS FOR LIQUID WASTE:

The effluent generated from the hospital should conform to the following limits :

PARAMETERS	PERMISSIBLE LIMITS
pH	6.5-9.0
Suspended solids	100 mg/1
Oil and grease	10 mg/1
BOD	30 mg/1
COD	250 mg/1
Bio-assay test	90% survival of fish after 96 hours in 100% effluent

These limits are applicable to those hospitals which are either connected with sewers without terminal sewage treatment plant or not connected to public sewers. For discharge into public sewers with terminal facilities, the general standards as notified under the Environment (Protection) Act, 1986 shall be applicable.

STANDARDS OF MICROWAVING:

1. Microwave treatment shall not be used for cytotoxic, hazardous or radioactive wastes, contaminated animal carcasses, body parts and large metal items.
2. The microwave system shall comply with the efficacy test/routine tests and a performance guarantee may be provided by the supplier before operation of the unit.
3. The microwave should completely and consistently kill the bacteria and other pathogenic organisms that is ensured by approved bio-logical indicator at the maximum design capacity of each microwave unit. Biological indicators for microwave shall be Bacillus Subtilis spores using vials or spore strips with at least 1x104 spores per milliliter.

STANDARDS FOR DEEP BURIAL

1. A pit or trench should be dug about 2 metres deep. It should be half filled with waste, then covered with lime within 50 cm of the surface, before filling the rest of the pit with soil.
2. It must be ensured that animals do not have any access to burial sites. Covers of galvanized iron/wire meshes may be used.
3. On each occasion, when wastes are added to the pit, a layer of 10 cm of soil shall be added to cover the wastes.
4. Burial must be performed under close and dedicated supervision.
5. The deep burial site should be relatively impermeable and no shallow well should be close to the site.
6. The pits should be distant from habitation, and sited so as to ensure that no contamination occurs of any surface water or groundwater. The area should not be prone to flooding or erosion.
7. The location of the deep burial site will be authorized by the prescribed authority.
8. The institution shall maintain a record of all pits for deep burial.