

(Ref:- [http://www.mppcb.nic.in/bio-medical\\_waste.htm#BIO-MEDICAL%20WASTE%20MANAGEMENT](http://www.mppcb.nic.in/bio-medical_waste.htm#BIO-MEDICAL%20WASTE%20MANAGEMENT) )

## **BIO-MEDICAL WASTE (MANAGEMENT AND HANDLING) RULES 1998**

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### **Salient Features:**

- Published by Govt. of India, under Section 6 & 25 of Environmental Protection Act 1986 on 20/7/98 and appeared in official gazette of India on 27/7/98.
- Deals with the generation/handling/treatment/disposal of Bio Medical Waste.
- These rules apply to all persons who generate, collect, receive, store, transport, treat, dispose or handle bio-medical waste in any form.
- Rule 4 specifies duty of occupier (generator) to take all steps to ensure that such waste is handled without any adverse effect to human health and the environment.
- Rule 5 and 6 specifies waste management procedures.
- Section 7 is about prescribed authority that shall implement these rules. In Madhya Pradesh M.P. Pollution Control Board has been declared as prescribed authority by the State Govt.
- These rules apply to all persons who generate, collect, receive, store, transport, treat, dispose or handle bio-medical Waste in any form. Every

occupier of an institution generating, collecting, receiving, storing, transporting, treating disposal and for handling Bio-medical waste in any other manner, except such occupier of clinics, dispensaries, pathological laboratories, blood banks providing treatment/service to less Than 1000 patients per month and also the operators of Biomedical waste facility are covered under these rules.

- [Form 1](#) has been fixed for application of authorization. Govt. has also prescribed necessary fee. of M.P.
- An advisory Committee as required under rule 9 has also been constituted by Govt. of M.P. Constitution of appellate authority is underway.
- Following the rule 7(1) of the said rules, the Government of M.P. Has nominated M.P. Pollution Control Board, Bhopal as prescribed authority to implement these rules in Madhya Prudish, vide their order dated 23/10/98.
- Govt. of M.P. has also issued a notification in regard of necessary fee for issuance of authorization under rule 8(3) of these rules on dated 12/2/99.
- As per these rules, this shall be the duty of every occupier {as defined in rule 3(8)} of an institution generating bio-medical waste which includes a hospital, nursing home, clinic dispensary, veterinary institution, animal house, pathological laboratory blood bank by what ever name called to take all steps to ensure that such waste is handled without any adverse effect to human health and the environment.

## **BIO-MEDICAL WASTE MANAGEMENT**

(Guidelines - there of)

At present with advancement of medical science most of the hospitals/nursing homes are now equipped with latest instruments for diagnosis and treatment of various diseases. One of the most important aspect associated with hospitals is the safe management of the wastes; generated from these establishments, which contains human anatomical wastes blood, body fluid, disposable syringe, used bandages, surgical gloves, Blood bags intravenous tubes etc. The Bio-medical waste generated from various sources has become a problem and much attention is being given worldwide to find out solution of this problem. The main concern lies with the hospital waste generated from large hospitals/nursing homes as it may pose deleterious effects due to its hazardous nature. Bio-medical wastes, if not handled in a proper way, is a potent source of diseases, like AIDS, Tuberculosis, Hepatitis and other bacterial diseases causing serious threats to human health. Owing to the discussed potential threats this waste needs prime attention for its safe and proper disposal.

According to these rules Bio-medical wastes have been categorized under [10 categories](#) and are required to be managed and handled as per prescribed procedures.

## HANDLING OF BIO-MEDICAL WASTE

- [CATEGORIES OF BIO-MEDICAL WASTE](#)
- [COLOR CODING & TYPE OF CONTAINER FOR DISPOSAL OF BIO-MEDICAL WASTE](#)
- [LABEL FOR BIO-MEDICAL WASTE CONTAINERS/BAGS](#)
- [LABEL FOR TRANSPORT OF BIO-MEDICAL WASTE CONTAINERS/BAGS](#)

### CATEGORIES OF BIO-MEDICAL WASTE

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

◆ Mutilation/shredding must be such so as to prevent unauthorised 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	Treatment & Disposal	Waste Category
Cat. No. 1	Incineration ■/deep ⊕ burial	Human Anatomical Waste (human tissues, organs, body parts)
Cat. No. 2	Incineration ■/deep burial	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)
Cat. No. 3	Local autoclaving/ micro waving/ incineration ■	Microbiology & Biotechnology waste (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 biological, toxins, dishes and devices used for transfer of cultures)

Cat. No. 4	Disinfections (chemical treatment /autoclaving/micro waving and mutilation shredding ◆)	Waste Sharps (needles, syringes, scalpels blades, glass etc. that may cause puncture and cuts. This includes both used & unused sharps)
Cat. No. 5	Incineration ■/ destruction & drugs disposal in secured landfills	Discarded Medicines and Cytotoxic drugs (wastes comprising of outdated, contaminated and discarded medicines)
Cat. No. 6	Incineration ■, autoclaving/micro waving	Solid Waste (Items contaminated with blood and body fluids including cotton, dressings, soiled plaster casts, line beddings, other material contaminated with blood)
Cat. No. 7	Disinfections by chemical treatment autoclaving/micro waving & mutilation shredding. ◆	Solid Waste (waste generated from disposable items other than the waste sharps such as tubing, catheters, intravenous sets etc.)
Cat. No. 8	Disinfections by chemical treatment and discharge into drain	Liquid Waste (waste generated from laboratory & washing, cleaning, house-keeping and disinfecting activities)
Cat. No. 9	Disposal in municipal landfill	Incineration Ash (ash from incineration of any bio-medical waste)
Cat. No. 10	Chemical treatment & discharge into drain for liquid & secured landfill for solids	Chemical Waste (chemicals used in production of biological, chemicals, used in disinfection, as insecticides, etc)
<b>Option</b>	<b>Treatment &amp; Disposal</b>	<b>Waste Category</b>

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The most essential part of hospital waste management is the segregation of Bio-medical waste. The segregation of the waste should be performed within the premises of the hospital/nursing homes. The color coding, type of container to be used for different waste category and suggested treatment options are listed below.

## COLOR CODING & TYPE OF CONTAINER FOR DISPOSAL OF BIO-MEDICAL WASTE

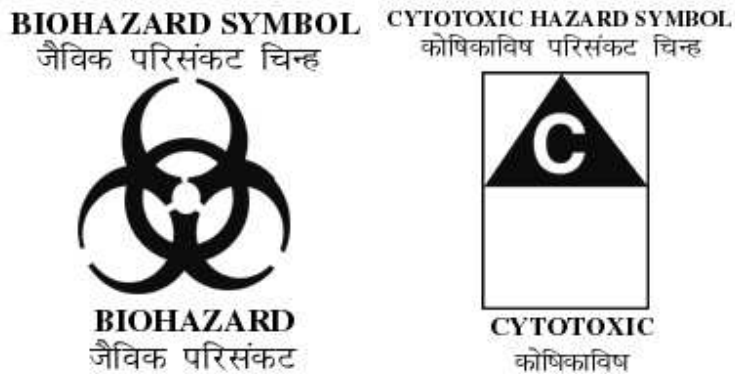
Colour Coding	Type of Containers	Waste Category	Treatment Options as per Schedule 1
Yellow	Plastic bag	1,2,3,6	Incineration/deep burial
Red	Disinfected Container/ Plastic bag	3,6,7	Autoclaving/Micro waving/ Chemical Treatment
Blue/ White translucent	Plastic bag/puncture proof container	4,7	Autoclaving/Micro waving/ chemical treatment and destruction/shredding
Black	Plastic bag	5,9,10 (Solid)	Disposal in secured landfill

### Notes:

1. Color coding of waste categories with multiple treatment options as defined in [Schedule 1](#), shall be selected depending on treatment option chosen, which shall be as specified in Schedule 1.
2. Waste collection bags for waste types needing incineration shall not be made of chlorinated plastics.
3. Categories 8 and 10 (liquid) do not require containers/bags.
4. Category 3 if disinfected locally need not be put in Containers/bags.

Different labels for Bio-medical waste containers and bags shall be required for identification and safe handling of this waste. These labels for storage/transportation of Biomedical waste are as under,:

### LABEL FOR BIO-MEDICAL WASTE CONTAINERS/BAGS



### LABEL FOR TRANSPORT OF BIO-MEDICAL WASTE CONTAINERS/BAGS

	Day:_____ Month _____
	Year _____
Waste Category No. _____	Date of generation _____
Waste Class	
Waste Description	
Sender's Name & Address	Receiver's Name & Address
Phone No.:_____	Phone No.:_____
Telex No. _____	Telex No. :_____
Fax No. _____	Fax No. : _____
Contact Person _____	Contact Person:_____
In case of emergency please Contact:	
Name & Address:	
Phone No.	

Central Govt. has laid down [standards for treatment and disposal of Bio-medical waste.](#)

## **STANDARDS FOR TREATMENT & DISPOSAL OF BIO-MEDICAL WASTES**

- [Overview](#)
- [Standards for Waste Autoclaving](#)
- [Standards for Liquid Waste](#)
- [Standards for Micro Waving](#)
- [Standards for Deep Burial](#)
- [Schedule for Waste Treatment](#)

### **Overview**

All incinerators shall meet the following operating and emission standards:

- **Operating Standards**

- Combustion efficiency (CE) shall be at least 99.00%
- The Combustion efficiency is computed as follow:

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

- The temperature of the primary chamber shall be 800±50 °C.
- The secondary chamber gas residence time shall be at least (one) second at 1050± 05 °C ,with minimum 3% Oxygen in the stack gas.

- **Emission Standards**

S. No.	Parameters	Concentration mg/Nm <sup>3</sup> at (12% CO <sub>2</sub> correction)
1.	Particulate matter	150
2.	Nitrogen Oxides	450
3.	HCl	50
4.	Minimum stack height shall be 30 meters above ground	
5.	Volatile organic compounds in ash 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 & 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,

1. When operating a gravity flow autoclave, medical waste shall be subjected to:

- a. A temperature of not less than 121°C and pressure of 15 pounds per square inch (psi) for an autoclave residence time of not less than 60 minutes; or
- b. A temperature of non less than 135 °C and a pressure of 31 psi for an autoclave residence time of not less than 45 minutes; or
- c. A temperature of not less than 149 °C and a pressure of 52 psi for an autoclave residence time of not less than 30 minutes.

2. 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 :

- a. A temperature of not less than 121 °C and pressure of 15 psi for an autoclave residence time of not less than 45 minutes; or
- b. 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;

3. 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 indicators 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.

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

5. Validation test

**Spore testing :**

The autoclave should completely and consistently kill the 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  $1 \times 10^4$  spores per milliliter. 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.

6. Routine Test

A chemical indicator strip/tape that changes 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 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/l
Oil and Grease	10 mg/l
BOD	30 mg/l
COD	250 mg/l

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 should be applicable.

### STANDARDS OF MICRO WAVING

7. Microwave treatment shall not be used for cytotoxic, hazardous or radioactive wastes, contaminated animal carcasses, body parts and large metal items.

8. 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.

9. The microwave should completely and consistently kill the bacteria and other pathogenic organisms that is ensured by approved biological indicator at the maximum design capacity of each microwave unit. Biological indicators for microwave shall be Bacillus Subtilis spores strips with at least  $1 \times 10^4$  spores per milliliter.

## **STANDARDS FOR DEEP BURIAL**

- A pit or trench should be dug about 2 meters 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.
- It must be ensured that animals do not have any access to burial sites. Covers of galvanised iron/wire meshes may be used.
- On each occasion, when wastes are added to the pit, a layer of 10 cm of soil shall be added to cover the wastes.
- Burial must be performed under close and dedicated supervision.
- The deep burial site should be relatively impermeable and no shallow well should be close to the site.
- The pits should be distant from habitation, and sited so as to ensure that no contamination occurs of any surface water or ground water. The area should not be prone to flooding or erosion.
- The location of the deep burial site will be authorised by the prescribed authority.
- The institution shall maintain a record of all pits for deep burial.
- A time limit has been defined by Govt. of India for installation of treatment facilities for Bio-medical waste as shown below:

### **SCHEDULE VI**

(See Rule 5)

## **SCHEDULE FOR WASTE TREATMENT FACILITIES LIKE INCINERATION AUTOCLAVE/MICROWAVE SYSTEM**

- S. Hospitals and nursing homes in towns by 31st December, 1991 with population of 30 lakhs and above, by 31<sup>st</sup> Dec, 1999 or earlier.
- T. Hospitals and nursing homes in towns with population of below 30 lakhs,
  - a. with 500 beds and above by 31st December, 1999 or earlier
  - b. with 200 beds and above but less by 31st December, 2000 than 500 beds or earlier
  - c. with 50 beds and above but less than 200 beds by 31st December, 2001 or earlier
  - d. with less than 50 beds by 31st December, 2002 or earlier
- U. All other institutions generating bio-medical waste, not included in A or earlier and B above by 31st Dec, 2002.

Application for authorisation should be in Prescribed [Form I](#)

When any accident occurs at any institution or facility or any other site where bio-medical waste is handled or during transportation of such waste, the authorised person shall report the accident in [Form III](#) to the prescribed authority forthwith.