

**Towards a Healthy Future**



**Biomedical Waste Management  
Gujarat Pollution Control Board  
Gandhinagar**

## **INTERPRETATION OF- BIOMEDICAL WASTE (MANAGEMENT AND HANDLING) RULES**

### **1.0 INTRODUCTION**

The management of health care waste is a subject of considerable concern to public health and infection-control specialists, as well as the general public. It is a well known fact that in several types of health care activities, various types of hazardous and contagious materials are generated. Even though the consequences of discarding such waste carelessly are well known, it is only recently that adequate initiatives to manage this waste in a scientific manner are being taken in India.

Unscientific disposal of health care waste may lead to the transmission of communicable diseases such as gastro-enteric infections, respiratory infections, spreading through air water and direct human contact with the blood and infectious body fluids. These could be responsible for transmission of Hepatitis B, C, E and AIDS within the community. Health care professionals and the general public are at risk due to this. Diseases are spread by improper treatment and disposal of waste. Rag pickers expose themselves to diseases like Hepatitis B, Tetanus, Staphylococci, etc. while handling items like needles, surgical gloves, blood bags etc.

### **2.0 Biomedical Waste (Management and Handling) Rules:**

The Bio-Medical Waste (Management and Handling) Rules; 1998 are conferred by section 6,8, 25 of the Environment (Protection) Act, 1986 (29 of 1986).

#### **Environment (Protection) Act, 1986**

This Act is an umbrella legislation providing a single focus in the country for the protection of Environment and seeks to plug the loopholes of earlier legislation relating to environment. Several sets of rules relating to various aspects of management of hazardous chemicals, waste, microorganisms, biomedical waste etc..

1. Whoever fails to comply with or contravenes any of the provisions of this Act, or the rules made or orders or directions issued there under, shall in respect of each such failure or contravention, be punishable with imprisonment for a term which may extend to one five years or with fine which may extend to one lakh rupees, or with both, and in case the failure or contravention continues with additional fine which may extend to five thousand rupees for every day during which such failure or contravention continues after the conviction for the first such failure or contravention.
2. If the failure or contravention referred to in sub-section (1) continues beyond a period of one year after the date of conviction, the offender shall be punishable with imprisonment for a term which may extend to seven years.

**3.0 Application:** *These rules apply to all persons who generate, collect, receive, store, transport, treat, dispose or handle bio-medical waste in any form.*

*Biomedical waste means any waste, which is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining thereto or in the production or testing of biologicals (means any preparation made from organisms or micro-organisms or product of metabolism and biochemical reactions intended for use in the diagnosis, immunization or the treatment of human beings or animals or in research activities pertaining thereto;)including categories mentioned in schedule-I.*

These Rules will apply to all institutions generating biomedical waste which includes hospitals, nursing homes, clinics, dispensaries, veterinary hospital, animal house, research and pathological lab, and Blood Bank etc., generating biomedical waste.

The Biomedical Waste (Management and Handling) Rules 1998, explicitly state that waste handling and treatment facilities shall have to be established within stipulated deadlines or earlier, for all waste generating establishments.

- It is to be also noted that the hospitals/clinics/ nursing homes/ dispensaries etc., which treat below 1000 patients/month though do not have to apply for authorisation stated above but have to comply with the BMW rules.

## **2.0 DUTY OF OCCUPIER GENERATING BIO-MEDICAL WASTE:**

### **Cartoon**

*It shall be the duty of every occupier of an institution generating bio-medical waste*

- 2) The occupier where required should set up the bio-medical treatment facility (*Biomedical waste treatment facility means any waste facility wherein treatment, disposal of Bio-medical waste or processes incidental to such treatment or disposal is carried out and includes common treatment facility*) and ensure requisite treatment of waste at a common treatment facility or any other waste treatment facility.
- 3) It is the duty of occupier to ensure proper segregation of waste into container/bags at the point of generation. He should also ensure proper labeling of these bags according to schedule III and IV.
- 4) The occupier should ensure maintenance of records about the generation, collection, reception, storage, transportation, treatment, disposal and or any form of handling biomedical waste.
- 5) Make an application to the concerned authorities (Pollution Control Committees in case of Union Territories) for grant of authorisation shall be accompanied by as a fee as may be prescribed by the concerned State Government.
- 6) Submit a report to the prescribed authority by 31<sup>st</sup> January every year. The report should include information about the categories and quantities of biomedical waste handled during the preceeding year (Form II).
- 7) Report any accident to the prescribed authority Form-III.

### **3.0 TREATMENT OF WASTE:**

- (1) *(1) Bio-medical waste shall be treated and disposed of in accordance with Schedule I, and in compliance with the standards prescribed in Schedule V.*
- (2) *Every occupier, where required, shall set up in accordance with the time-schedule in Schedule VI, requisite bio-medical waste treatment facilities like incinerator, autoclave, microwave system for the treatment of waste, or, ensure requisite treatment of waste at a common waste treatment facility or any other waste treatment facility.*

- 1) Treatment may be defined as the process that changes the character of hazardous waste to render them less hazardous or non-hazardous. Treatment renders waste unrecognisable and may or may not reduce volume.
- 2) Treatment of BMW should depend upon nature of the waste, volume of waste and technology (i.e. technologically and economically viable and environmentally safe) and must meet regulatory standards & public acceptance.
- 3) Sometimes pre-treatment of waste may be required before storage/ transportation or

**CATEGORIES OF BIO-MEDICAL WASTE AND THE VARIOUS DISPOSAL TECHNOLOGIES ADOPTED**

<b>Waste Category No.</b>	<b>Waste Category (Type)</b>	<b>Treatment &amp; Disposal</b>	<b>Type of container plastic bag</b>	<b>Colour coding</b>
<b>1</b>	<b>Human Anatomical Waste:</b> (Human tissues, organs, body parts)	Incineration/ deep burial	<b>Plastic bag</b>	<b>yellow</b>
<b>2</b>	<b>Animal Waste:</b> (Animal tissues, organs, body parts, carcasses, bleeding parts, fluids, blood, experimental animals used in research, waste generated by veterinary hospitals colleges, discharge from hospitals, animal houses)	Incineration/ deep burial	<b>Plastic bag</b>	<b>yellow</b>
<b>3</b>	<b>Microbiology &amp; Biotechnology waste:</b> (Waste 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, waste from production of biologicals, toxins, dishes and devices used for transfer of cultures).	Local autoclaving/ incineration, micro waving	<b>Plastic bag/disinfected container</b>	<b>Red</b>
<b>4</b>	<b>Waste sharps:</b> (Needles, syringes, scalpels, blades, glass(broken and unbroken) etc. that may cause punctures and	Disinfection by chemical treatment/autoclaving, micro	<b>Plasticbag/punctureproof container</b>	<b>Blue/ white translucent</b>

7	<b>Solid Waste:</b> (Waste generated from disposable items other than waste sharps such as catheters, intravenous sets, etc).	Disinfection - chemical treatment, autoclaving/ micro waving and mutilation/ shredding	<b>Plastic bag/ puncture proof container</b>	<b>Red/ blue/white translucent.</b>
8	<b>Liquid Waste:</b> (Waste generated from laboratory and washing, cleaning, house-keeping and disinfecting activities).	Disinfection by chemical treatment and discharge into drain		
9	<b>Incineration Ash:</b> (Ash from incineration of any bio- medical waste).	Disposal in municipal landfill.	<b>Plastic bag</b>	<b>Black</b>
10	<b>Chemical Waste:</b> ( chemicals used in production of biologicals, chemicals used in disinfections, as insecticides, etc).	Chemical treatment/discharges into drains for liquids and secured landfills for solids.	<b>Plastic bag</b>	<b>Black</b>

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

#### **Chemical disinfection**

I.I. Chemical disinfection is used routinely in health care to kill microorganisms on medical equipment and on the floors and walls, is now being extended to the treatment of health-care waste. Chemicals are added to waste to kill or inactivate the pathogens it contains; this treatment usually results in disinfection rather than sterilization. Chemical disinfection is most suitable for treating liquid waste such as

- V. The aim of disinfection is to eliminate microorganisms or at least reduce their numbers to a “satisfactory” level. Some disinfectants are effective in killing or inactivating specific types of microorganisms and others are effective against all types. It is therefore essential to know the identity of the target microorganisms to be destroyed. However, selection of disinfectants depends not only on their effectiveness, but also on their corrosiveness and other hazards related to their handling.
- VI. The types of chemicals used for disinfection of health-care waste are mostly aldehydes, chlorine compounds, ammonium salts, and phenolic compounds; the characteristics of those most commonly used for waste applications.
- VII. Powerful disinfectants are often hazardous and toxic; many are harmful to skin and mucous membranes. Users should therefore wear protective clothes, including gloves and protective glasses, including gloves and protective glasses or goggles. Disinfectants are also aggressive to certain building materials and should be handled and stored accordingly.
- VIII. Small amounts of disinfectants can be discharged into sewers without pretreatment, provided that there is an adequate sewage-treatment process; large amounts of disinfectants should never be discharged into sewers. No disinfectants should be discharged into natural water bodies.

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

Shredding of solid waste health-care waste before disinfection is essential for the following reasons:

- To increase the extent of contact between waste and disinfection by increasing the surface area and eliminating any enclosed spaces;
- To render any body parts unrecognizable to avoid any adverse visual impact on disposal;
- To reduce the volume of waste.

It is to be taken care of that mutilation/shredding must be done in such a manner as the original shape is not maintained and the waste cannot be reused again.

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

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 ground water. The area should not be prone to flooding or erosion.*
7. *The location of the deep burial site will be authorised by the prescribed authority.*
8. *The institution shall maintain a record of all pits for deep burial.*

*Notes:*

1. *Colour coding of waste categories with multiple treatment options as defined in Schedule I, shall be selected depending on treatment option chosen, which shall be as specified in Schedule I.*
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.*

**Segregation, Packaging, Transportation and Storage**

- (1) *Bio-medical waste shall not be mixed with other wastes.*
- (2) *Bio-medical waste shall be segregated into containers/bags at the point of generation in accordance with Schedule II prior to its storage, transportation, treatment and disposal. The containers shall be labelled according to Schedule III.*
- (3) *If a container is transported from the premises where bio-medical waste is generated to any waste treatment facility outside the premises, the container shall, apart from the label prescribed in Schedule III, also carry information prescribed in*

The key to minimization and effective management of health-care waste is segregation (separation) and identification of the waste. Appropriate handling, treatment and disposal of waste by type reduces costs and does much to protect public health. Segregation is the key to any waste management scheme. By segregation, different categories and types of BMW are sorted and placed in different containers or bags as specified in schedule II of BMW rules. Segregation at source is necessary, as the different types of waste need treatment and disposal. It is a safe method by which the generator and the handler to help in - (i) reduce the total treatment cost, (ii) ensuring that general waste does not become infectious and (iii) reduce the chances of infection in health care worker.

Segregation should always be the responsibility of the waste producer, should take place as close as possible to where the waste is generated. The most appropriate way of identifying the categories of health-care waste is by sorting the waste into colour-coded plastic bags or containers. The rules do not mention a particular colour for general waste. Therefore, the hospital authorities may use any other appropriate colour for the general waste.

The collection of bio-medical waste should be done in accordance with the directions contained in the notification of BMW Rules as per the provisions of the BMW Rules '98.

- 1) Waste should be segregated and clearly labelled at source. It is mandatory that the biohazard symbol must be clearly seen on the bins collecting biomedical waste. This is the most important step in handling waste and mainly from the patient care areas.
- 2) A system of colour code for containers and types of waste should be followed. Appropriate containers or bag holders should be placed in all locations where particular categories of waste may be generated. Instructions on waste separation and identification should be posted at each waste collection point to remind staff of the procedures. Containers should be removed when they are three-quarters full. Ideally the plastic bags should be made of combustible, non-halogenated plastics.
- 3) Staff should never attempt to correct errors of segregation by removing items from a bag or container after disposal or by placing one bag inside another bag of a different colour.
- 4) If general and hazardous waste are accidentally mixed, the mixture should be treated as hazardous health care waste.
- 5) Waste should be collected daily (or as frequently as required) and transported to designated central storage site. Nursing and other clinical staff should ensure that waste bags are tightly closed or sealed when they are about three-quarters full. Bags should not be closed by stapling. The bags or containers should be replaced immediately with new

- 11) Waste must be transported away from the areas of generation at regular intervals or every morning. Breakdowns in transport will play wide spread havoc on the entire system and therefore back-up staff and equipment must be planned for, and made available.
- 12) Transport of waste from areas of generation must be done only by designated staffs, aware of the hazards of the material they handle and of protective measures to be taken. They should be provided with adequate personal protective equipment and should be instructed to report any injury to the medical authorities.
- 13) Untreated biomedical waste shall be transported only in specially designed vehicles.
- 14) No untreated bio-medical waste shall be stored beyond a period of 48 hours.
- 15) The transport vehicle (cart / barrow) must be designated and must not be used for any other purpose.
- 16) If for any reasons it becomes necessary to store the waste beyond a period of 48 hours, permission from the prescribed authority (Pollution Control Board and Pollution Control Committee, established by the Government of every State and Union Territory) must be taken, and it must be ensured that it does not adversely affect human health and the environment.
- 17) Before final disposal, infectious waste must be subjected to treatment with either heat or chemicals. Non-infectious waste need not be treated.
- 18) Regular medical check-up for the staff is mandatory. Immunisation against Hepatitis B and other blood borne diseases is mandatory.

In contrast to the available data that says that biomedical waste form only 15-20% of the total waste generated it has been ascertained through estimation at varied sources that in large hospitals (above 500 beds), the quantity of biomedical waste is about 33% of the total waste generated. However in nursing homes, dispensaries, diagnostic labs, blood banks, clinics and even veterinary and research institutions, the proportion of biomedical waste to the total waste is much higher ranging from almost 50% in clinics, labs, blood banks, to 95% in veterinary and research institutions. [Based on the CEE, Delhi, cross-sectional study of knowledge and compliance to Biomedical Waste (Management and Handling) rules,1998].

## **2.1 WASTE CATEGORIES AND THEIR TREATMENT METHODOLOGIES:**

**SCHEDULE I**  
(see Rule 5)  
**CATEGORIES OF BIO-MEDICAL WASTE**

<b>Waste Category No.</b>	<b>Waste Category (Type)</b>	<b>Treatment &amp; Disposal</b>
<b>1</b>	<b>Human Anatomical Waste:</b> (Human tissues, organs, body parts)	Incineration/ deep burial
<b>2</b>	<b>Animal Waste:</b> (Animal tissues, organs, body parts, carcasses, bleeding parts, fluids, blood, experimental animals used in research, waste generated by veterinary hospitals colleges, discharge from hospitals, animal houses).	Incineration/ deep burial
<b>3</b>	<b>Microbiology &amp; Biotechnology waste:</b> (Waste 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, waste from production of biologicals, toxins, dishes and devices used for transfer of cultures).	Local autoclaving/incineration, microwaving
<b>4</b>	<b>Waste sharps:</b> (Needles, syringes, scalpels, blades, glass(broken and unbroken) etc. that may cause punctures and cuts. This includes both used and unused sharps).	Disinfection by chemical treatment/autoclaving, microwaving and mutilation/shredding.
<b>5</b>	<b>Discarded Medicines &amp; cytotoxic drugs:</b> (Wastes comprising of outdated, contaminated drugs and discarded medicines)	Incineration/ destruction and disposal in secured landfills
<b>6</b>	<b>Soiled waste:</b> (Items contaminated with blood, body fluids including cotton, dressing, soiled plaster casts, linens, bedding, other material contaminated with blood).	Incineration/ autoclaving/ and microwaving.
<b>7</b>	<b>Solid Waste:</b> (Waste generated from disposable items other than waste sharps such as catheters, intravenous sets, etc).	Disinfection - chemical

## Multilation/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.

### **SCHEDULE –II**

(see Rule 6)

#### **COLOUR CODING AND TYPE OF CONTAINER FOR DISPOSAL OF BIOMEDICAL WASTE**

<b>Colour coding</b>	<b>Type of container</b>	<b>Waste category No.</b>	<b>Treatment options as per Schedule I</b>
<i>Yellow</i>	<i>Plastic bag</i>	<i>1,2,3,6</i>	<i>Incineration/deep burial</i>
<i>Red</i>	<i>Disinfected container/plastic bag</i>	<i>3,6,7</i>	<i>Autoclaving / Microwaving/ Chemical Treatment</i>
<i>Blue/white Translucent</i>	<i>Plastic bag/ puncture proof container</i>	<i>4,7</i>	<i>Autoclaving / Microwaving/ Chemical Treatment and destruction/shredding</i>
<i>Black</i>	<i>Plastic Bag</i>	<i>5,9,10</i>	<i>Disposal in secured landfill.</i>

#### **Notes:**

1. Colour coding of waste categories with multiple treatment options as defined in Schedule I, shall be selected depending on treatment option chosen, which shall be as specified in Schedule I.
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.

*(5) An authorisation shall be granted for a period of three years, including an initial trial period of one year from the date of issue. Thereafter, an application shall be made by the occupier/operator for renewal. All such subsequent authorisation shall be for a period of three years. A provisional authorisation will be granted for the trial period, to enable the occupier/operator to demonstrate the capacity of the facility.*

*(6) The prescribed authority may after giving reasonable opportunity of being heard to the applicant and for reasons thereof to be recorded in writing, refuse to grant or renew authorisation.*

*(7) Every application for authorisation shall be disposed of by the prescribed authority within ninety days from the date of receipt of the application.*

*(8) The prescribed authority may cancel or suspend an authorisation, if for reasons, to be recorded in writing, the occupier/operator has failed to comply with any provision of the Act or these rules :*

*Provided that no authorisation shall be cancelled or suspended without giving a reasonable opportunity to the occupier/operator of being heard.*

As per the BWM (Second Amendment) Rules, 2000, the prescribed authority of enforcing the provisions in the rules, shall be the State Pollution Control Boards in states and State Pollution Control Committees in respect to the Union territories. Accordingly all the prescribed authorities appointed earlier by respective State Govt. and Union territories shall be transferred to the concerned State Pollution Control Board/ Pollution Control Committees. However, these prescribed authorities if not State Pollution Control boards/ Committees shall automatically be transferred to concerning State Pollution Control Board in respect of States and the Pollution Control Committees in case of Union Territories. The authorisation fee structure is also different for different states.

As per the provisions of this section the responsibility of the prescribed authority (Pollution Control Board/ Pollution Control Committees) & the occupier has been defined. The powers & responsibilities of the prescribed authority given under this section are:

- - Grant for authorisation to the institutions covered under this rule.
- - Implementing various provisions of this rule for proper management & handling of

- - To give all the relevant information (no. of beds, storage, treatment, disposal facilities etc. )along with necessary fee, as prescribed by the Pollution control Board/ Pollution Control Committees, for grant of authorisation.
- - To renew the authorisation within the specified period.
- - Refusal or suspension of authorisation only when recorded in writing giving reason.
- - Automatic grant of authorisation if the application not disposed by the prescribed authority within ninety days of receipt of the application is complete in all respects.
- - Follow

### **5.0 AUTHORISATION:**

*(1) Every occupier of an institution generating, collecting, receiving, storing, transporting, treating, disposing and/or 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 (one thousand) patients per month, shall make an application in Form 1 to the prescribed authority for grant of authorisation.*

*(2) Every operator of a bio-medical waste facility shall make an application in Form 1 to the prescribed authority for grant of authorisation.*

*(3) Every application in Form 1 for grant of authorisation shall be accompanied by a fee as may be prescribed by the Government of the State or Union Territory.*

*(4) The authorisation to operate a facility shall be issued in Form IV, subject to conditions laid therein and such other condition as the prescribed authority, may consider it necessary.*

As per the provisions of this section every occupier generating, receiving, storing, transporting, treating, disposing and/or handling biomedical waste in any manner have to obtain the authorisation from the prescribed authority. However, clinics, dispensaries, pathological laboratories, blood banks providing treatment services to less than 1000 patients per month are not required to obtain authorisation, but, they have to comply with the provisions of this rule for proper management & handling of bio-medical waste generated in their premises.

The application of authorisation should be as per prescribed proforma in Form I of BMW Rules '98. The authorisation will be granted in prescribed proforma along with conditions laid down by the prescribed authority as fits the proper management of RMW

(B)	Every occupier of an institution generating collecting, receiving, storing, Transporting, disposing and per handling biomedical waste in any other manner, including clinic, dispensaries, pathological laboratories, blood banks, veterinary institution, animal house, by whatever name called, but not included in A above.	1000
(C)	Every Institution and operator connected with Management and handling of Bio-Medical waste.	
	i) The Operators having an incinerator with capacity upto 50 kgs,per hour	10,000
	ii) Waste operator having an incinerator with capacity of more than 50 kegs per hour	20,000
	iii) Operator having facilities other than incinerator	1000

## 6.0 ADVISORY COMMITTEE

*The Government of every State/Union Territory shall constitute an advisory committee. The committee will include experts in the field of medical and health, animal husbandry and veterinary sciences, environmental management, municipal administration, and any other related department or organistaion including non-governmental organisations. As and when required, the committee shall advise the Government of the State/ Union Territory and the prescribed authority aout matters related to the implementation of these rules.*

As per the provisions of this rule every State Govt./ Union territory shall constitute an advisory committee which will include experts in the related field. This committee which will include experts in the related field. This committee will advise the Govt. and the prescribed authority on matters related to the implementation of these rules as when required.

## 7.0 ANNUAL REPORT:

*Every occupier/operator shall submit an annual report to the prescribed authority in Form 11 by 31 January every year, to include information about the categories and quantities of bio-medical wastes handled during the preceding year. The prescribed authority shall send this information in a compiled form to the Central Pollution Control Board by 31 March every year.*

As per the provisions under this section every occupier/ operator handling or

This section provides for maintaining proper records of bio-medical waste generated, collected, receipted, stored, transported, treated, disposed and /or in any form handled by the occupier. These records may be inspected and verified by the representatives of the prescribed authority at any time.

### **8.0 ACCIDENT REPORTING:**

*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.*

This section provides for a procedure for reporting accidents or incidents and records to be kept. Such report should include the nature of accidents when and where they occurred and which staff were directly involved. Form III should be used for reporting the accidents to the prescribed authority. Spillages, damaged containers, inappropriate segregation, fire, serious sharp injuries etc., are some of the common occurrence causing accidents. Hospital authorities should be prepared for unexpected hazardous waste situations such as accidental spills, equipment failures, delays or interruption in waste collection, transport or treatment services or any other incidents that requires rapid action and decision making. It is advisable that emergencies should be addressed in hospital waste management plan. For example, the step by step emergency clean procedure of an infectious waste spill, to include a notification system, disinfectants to be used and documentation of actions taken should be part of the waste management policy as well as employees' training.

### **9.0 APPEAL:**

*Any person aggrieved by an order made by the prescribed authority under these rules may, within thirty days from the date on which the order is communicated to him, prefer an appeal in form V to such authority as the Government of State/Union Territory may think fit to constitute:*

*Provided that the authority may entertain the appeal after the expiry of the said period of thirty days if it is satisfied that the appellant was prevented by sufficient cause from filing the appeal in time.*

Any person aggrieved by an order made by the prescribed authority under these rules may, within thirty days from the date on which the order is communicated to him, prefer an appeal [in Form V] to such authority as the Government of State/Union Territory may think fit to constitute:

within their jurisdiction. However outside the jurisdiction of local bodies, such responsibility falls directly on the occupier, handling and managing BMW. It is to be noted that in a combined/ individual facility, only one treatment option may not serve the purpose. Therefore a combination of treatment options should be used to fulfil the obligations of BWM Rules, 98. While selecting treatment and disposal options technical and economic viability of the project should be carefully examined. Special care should also be taken while selecting site for treatment and disposal of BMW & authorisation/ permission from the prescribed authority should be taken prior to establishment of such facility.

A number of rules and recommendations apply to the disposal of health care wastes in common disposal facilities:

- (1) When health care waste is delivered to the incineration plant, the packaging should be checked to ensure that it is undamaged.
- (2) Health care waste should not be packed in cylindrical containers, because these could roll on the grids where they are placed for combustion.
- (3) Facilities should be available at the incineration site for the cleaning and disinfection of transportation equipment, including vehicles.
- (4) Deposit of health care waste in the normal reception bunker is not recommended; there is a risk of waste bags being damaged during transfer to the furnace by the overhead crane. Health care waste should therefore be loaded directly into the furnace.
- (5) Use of an automatic loading device for bags and containers of health-care waste, rather than manual loading, would protect the safety of workers.
- (6) Health-care waste should not be stored for more than 24 hours at an incineration plant; longer storage would require cooling facilities to prevent the growth of certain pathogens and development of odours.
- (7) The combustion efficiency should be checked. It should be at least 97% during incineration of health-care waste. Health care waste should be introduced into the furnace only when the normal conditions of combustion have been established- never during start-up or shut down of the combustion process.
- (8) The treatment facility should be designed to prevent contamination of ashes or wastewater by the health-care waste.

#### ***SCHEDULE V***

***(see Rule 5 and Schedule 1)***

***STANDARDS FOR TREATMENT AND DISPOSAL OF BIO-MEDICAL***

### *B. Emission Standards*

<i>Parameters</i>	<i>Concentration mg/Nm<sup>3</sup> at (12% CO<sub>2</sub> correction)</i>
<i>(1) Particulate matter</i>	<i>150</i>
<i>(2) Nitrogen Oxides</i>	<i>450</i>
<i>(3) HCl</i>	<i>50</i>
<i>(4) Minimum stack height shall be 30 metres above ground</i>	
<i>(5) Volatile organic compounds in ash shall not be more than 0.01%</i>	

#### *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.0dLS.H.S.1Diesel shall be used as fuel in the incinerator.*

Incineration is a high temperature dry oxidation process that reduces organic and combustible waste to inorganic, incombustible matter and results in a very significant reduction of waste volume and weight. This process is usually selected to treat wastes that cannot be recycled, reused, or disposed of in a landfill site. The process flow is illustrated below.

Incinerators can range from extremely sophisticated, high temperature operating plants to very basic combustion units that operate at much lower temperatures. All types of incinerator, if operated properly, eliminated pathogens from waste and reduce the waste to ashes. However, certain types of health care wastes e.g.

Specific waste parameters should be assessed at the planning stage to determine the most suitable type and size of incinerator:

- Current extent of waste production and types of health-care waste;
- Estimated future waste production;
- Production of incinerable waste per day (and per bed per day);
- All the physical parameters that determine the suitability of waste for incineration, such as low heating and moisture content.

The most reliable and commonly used treatment process for health-care waste is double-chamber incineration. The incinerator of this kind mainly comprises of a chamber where the waste is thermally decomposed through an oxygen deficient, medium-temperature combustion process (800-900°C), producing solid ashes and gases. The chamber includes a fuel burner, used to start the process. The waste is loaded in suitable bags or containers.

The gases produced in this way are burned at high temperature (900-1200°C) by a fuel burner in the post-combustion chamber, using an excess of air to minimize smoke and odours.

Their ashes will contain less than 1% unburnt material, which can be disposed of in landfills. However, to avoid dioxin production, no chlorinated plastic bags (and preferably no other chlorinated compounds) should be introduced into the incinerator, and should therefore not be used for packaging waste before its incineration.

**Waste that should not be incinerated:**

- Pressurized containers. Explosion may occur and cause damage to the equipment.
- Halogenated plastics (e.g. PVC). Exhaust gases contain hydrogen chloride and may contain dioxins.
- Wastes with high content of heavy metals (e.g. thermometers, batteries). Incineration will cause emission of toxic metals (e.g. lead, cadmium, mercury) into the atmosphere.

**Inadequate for the following wastes:**

- Pharmaceutical and chemical residues. The process is of limited suitability for these wastes and is not generally recommended; exhaust gases may contain toxic substances, such as dioxins. For safety reasons, therefore large quantities of these substances should not be introduced into this type of incinerator.

### **STANDARDS AND REQUIREMENTS FOR INCINERATION**

- Minimum height of the stack should be 30 metres above the ground.
- Suitably designed pollution control devices should be installed/ retrofitted with the incinerators to achieve the above emission limits.
- Waste to be incinerated should not be chemically treated with any chlorinated disinfectants.
- Chlorinated plastics should 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 fuels like LDO/LSHS/diesel shall be used as fuel in the incinerator.
- The Common Treatment Facility (CTF) should ideally be located at places away from human habitations but not far from these hospitals.

### **WASTE AUTOCLAVING**

#### *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 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 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 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*

*(V) 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 1X10<sup>4</sup> 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 the 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 over the waste package at different location to ensure that the inner content of the package has been adequately autoclaved*

The principle of autoclaving is the destruction of micro-organisms by steam under pressure. Autoclaves are used in health care facilities for sterilisation of heat-resistant patient care items. Autoclaving is an effective method for treating infectious waste before disposal. Autoclaving is necessary for treatment of the following types of waste:

- a) a) Waste arising from microbiology and biotechnology Departments/laboratories which may include highly infectious waste such as cultures. These must be autoclaved in special containers and then sent for disposal.
- b) b) Plastic disposables (infectious) including blood bags, urine bags. These should be autoclaved in special containers. Since autoclaving will not cause visible mutilation of plastics, hence mutilation/shredding is then advised to prevent illegal reuse. Plastics are rendered sterile after autoclaving

Autoclaves are of two types, gravity flow autoclave and vacuum autoclave, each with its own set of standards for operation.

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

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

### **11.0 WASTE 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 limit.*

*3. 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 using vials or spore strips with at least  $1 \times 10^1$  spores per milliliter.*

Microwaving utilises electromagnetic, microwaves that enter into or penetrate materials. Through the special arrangement of the entry of microwaves into treatment chamber, the waste is evenly heated to a temperature of 97°C -100°C. Microwaving makes it possible for treatment of waste at site (point of generation) and waste does not require shredding. Microwaving is suitable for the treatment of most infectious waste and are done in special microwaving waste treatment facility, with the exception of body parts, human organs, contaminated animals carcasses and metal items.

#### **The standards and requirements of microwaving :**

- - Microwaving treatment shall not be used for cytotoxic, hazardous or radioactive wastes, contaminated animal carcasses, body parts and metal items.
- - The microwave system should completely and consistently kill the bacteria and all other pathogenic organisms. This can be ensured by using approved biological indicators at a maximum design capacity of each microwave unit. The indicator organisms to test the system are Bacillus subtilis spores using vials or spore strips with atleast  $1 \times 10^4$  spores per millimeter.
- - Domestic microwave cannot be used to microwave hospital wastes.

### **13.0 DEEP BURIAL:**

- - When fresh waste is added to the pit, layer of 10cm of soil shall be added to cover the fresh waste.
- - Burial must be performed under close and dedicated supervision.
- - The burial site should be relatively impermeable and no shallow well should be close to the site.
- - The pit should be distant from any habitation, and sited so as to ensure that no contamination occurs to any surface or underground water source. The area should not be prone to flooding or erosion.
- - The location of the site shall be authorised by the prescribed authority and the institution shall maintain a record of all pits for deep burial.

#### **14.0 LIQUID WASTE:**

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

<i>PARAMETERS</i>	<i>PERMISSIBLE LIMITS</i>
<i>PH</i>	<i>6.3-9.0</i>
<i>Suspended solids</i>	<i>100 mg/l</i>
<i>Oil and grease</i>	<i>10 mg/l</i>
<i>BOD</i>	<i>30 mg/l</i>
<i>COD</i>	<i>250 mg/l</i>
<i>Bio-assay test</i>	<i>90% survival of fish after 96 hours in 100% effluent.</i>

*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.*

Liquid pathological and chemical wastes should be appropriately treated before discharge into the sewer. Pathological waste must be treated with chemical disinfectants, neutralised and then flushed into the sewage system. Chemical waste must first be neutralised with appropriate reagents and then flushed into the sewer system. The treated effluent should conform to the limits as stated in the law above.

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 sewer with terminal facilities the general standards as notified under

reducing the amount of medical waste that needs to be incinerated, and by bringing these issues before professional medical associations.

Because there is often a lack of awareness among hospital personnel at various levels and in the community, it becomes vital to formulate an effective communication strategy, specific to each of the target groups identified, to make them more aware of proper management of hospital waste. There is an urgent need to develop appropriate educational materials, both print and electronic, for better understanding and practice of hospital waste management.

### **BIOMEDICAL WASTE (MANAGEMENT AND HANDLING) RULES, 1998.**

#### **Salient Features:**

*Published by Govt. of India, under Sections 6, 8 & 25 of Environmental Protection Act, 1986 on 20-7-98 and appeared in official gazette of India on 27-7-98. The rules regulate the disposal of bio-medical waste including human anatomical waste, blood, body fluids, medicines, glass wares, soiled, liquid & biotechnology waste and animal waste. The objective is to take all steps to ensure safety to health & environment. The rules have been formulated as framework for handling & management of bio-medical wastes. The rules are applicable to all persons handling BMW. The duty of the occupier in the BMW Rule is absolutely in dealing with the generation/handling/treatment/disposal of Bio-Medical Waste.*

*According to Section 2 these rules apply to all persons who generate, collect, receive, store, transport, treat, dispose or handle bio-medical waste in any form.*

*Section 3 deals with the definitions of Act, animal house, authorisation, authorised person, bio-medical waste treatment facilities, occupier, operator of a bio-medical waste facility etc.*

*Section 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.*

*Section 5 specifies the segregation in category and treatment methods to be adopted*

*A form has been fixed for application of authorisation; necessary fee has to be notified by State Govt.*

*An advisory committee as required under **Section 9** has to be constituted by the State Government.*

***Section 10** is about the submission of an annual report to the prescribed authority in prescribed proforma, by the occupier/operator of any medical facility.*

***Section 11** deals with the maintenance of proper records relating to BMW, handling & management.*

***Section 12** deals with the procedure for reporting of an accident in prescribed proforma.*

***Section 13** deals with the constitution of an appellate committee to hear the aggrieved party of any order made by the prescribed authority.*

- ***Section 5 of EPA** provides for issuance of directions in writing – to direct the Closure/prohibition of any industry / operation / process, or stoppage / regulation of supply of electricity / water or other service. MoEF, Govt. of India Dt. 10/04/2001 has authorized Chairman – GPCB to issue directions under Section 5.*

## Biomedical Waste

**Biomedical waste** means any waste which is generated during the diagnosis, treatment or

medical care establishments. (Definition used in the Basel Convention regulating trans-boundary movement of hazardous wastes)

**Infectious waste** includes all those medical wastes, which have the potential to transmit viral, bacterial or parasitic diseases. It includes both human and animal infectious wastes and waste generated in laboratories and veterinary practice. Infectious waste is hazardous in nature.

**Pathological waste** include human tissues, organs and body parts and body fluids that are removed during surgery or autopsy or other medical procedures and specimen of body fluids and their containers. They are part of Infectious waste.

**Hazardous waste** is that which has a potential to threat on to human health and life. In hospitals, the Chemicals, Cytotoxic drugs, Incinerator ash and Radioactive elements constitute the hazardous waste.

Being extremely hazardous, biomedical waste if not handled properly can lead to serious health and environmental problems. Today, we have guidelines and rules for managing our biomedical wastes. If we do not follow the guidelines, it can get mixed up with general waste within the hospital and subsequently with municipal solid wastes, thereby rendering a greater volume of waste infectious and hazardous.

Many hospitals resort to unscientific burning to dispose off hospital wastes. This is a dangerous practice and must be stopped at once. Burning of infectious wastes and plastics can lead to dangerous levels of emissions of dioxins and furans in the environment that causes various types of cancers. Residual ash when not disposed off in secured landfills can also pollute the underground water and contaminate the soil.

### **Benefits of Waste Management**

- Waste management leads to cleaner and healthier surroundings
- Incidence of nosocomial infections reduces
- Cost of infection control within the hospital reduces
- Disease and death due to reuse and repackaging of infectious disposables is eliminated
- Segregation and appropriate treatment of medical waste reduces cost of waste management and generates revenue.

**Classification of Biomedical wastes:** General waste; Pathological waste; Radioactive waste; Chemical waste; Infectious plastics; Sharps; Pharmaceutical waste; Pressurised containers; Hazardous waste containers. The Health care waste originates from the following sources:

**Major sources of Healthcare wastes**

- Hospitals
- Clinics
- Nursing homes
- Dispensaries
- Laboratories
- Medical Colleges and research centres
- Veterinary colleges and animal research centres
- Blood banks
- Mortuaries
- Paramedic services
- Autopsy centers
- Old age homes

**Minor Sources of Healthcare wastes**

- Doctors' offices
- Dentists
- Ophthalmologists
- Homes
- Acupuncturists
- Psychiatric clinics
- Cosmetic piercing
- Funeral services
- Institutions for disabled persons.
- Blood donation camps

**Biomedical Waste Management involves**

- Waste minimization
- Segregation
- Collection
- Storage
- Transportation
- Treatment
- Disposal

## **FAQ (Frequently Asked Questions)**

### **-Biomedical waste management**

#### **1) What is Biomedical waste ?**

"Bio-Medical Waste" means any waste, which is generated during the diagnosis, treatment or immunisation of human beings or animals or in research activities pertaining thereto or in the production or testing of biologicals.

#### **2) What is Health Care waste?**

Apart from the hospital waste, it is the waste originating from 'minor' or 'scattered' sources- such as that produced in the course of healthcare undertaken in the health care establishments like laboratories, blood banks etc., and including home care (dialysis, insulin, injections, etc.).

#### **3) Why one has to be concerned about BioMedical Waste?**

Hospital waste management is part of hospital hygiene and maintenance activities. General hospital hygiene is a prerequisite for good medical waste management. A part of the hospital waste is hazardous and may cause a threat to health and life not only to patients and staff but also to the community at large. Besides the effect of hospital/clinical waste on hospital personnel and patients within the hospital, the impact on human health and environment outside the hospital is also important.

#### **4) Is it a serious issue?**

Yes, the improper handling, treatment and disposal of waste leads to serious problems like:

- the unsegregated and untreated infectious waste (15-20% ) will convert the entire non infectious general waste (70-80%) into infectious waste.
- the disposal of hospital waste in municipal dumpsite leads to cows feeding on the blood

- ineffective disinfection or sterilization during treatment can also cause spread of infection amongst hospital, municipal workers and the general public.
- increase in incidence and prevalence of diseases like AIDS, Hepatitis B&C, tuberculosis and other infectious diseases is due to inappropriate use, storage, treatment, transport and disposal of biomedical waste
- cats, rats, mosquitoes, flies and stray dog menace

#### **5) Why so much hue and cry about hospital waste?/**

The Ministry of Environment and Forests, Govt. of India, has notified the Biomedical Waste (Management and Handling) Rules 1998 with subsequent amendments (March 6<sup>th</sup> and June 2<sup>nd</sup> 2000)

#### **6) Who all come under the purview of the BMW Rules ?**

Every occupier of an institution generating, collecting, receiving, treating, disposing and handling biomedical waste, should comply to the rules within the stipulated time. This includes all clinics, dispensaries, laboratories, blood banks treating more than 1000 patients per month

#### **7) What are the benefits of waste management?**

- Waste management leads to cleaner and healthier surroundings
- Incidence of nosocomial infections reduces
- Cost of infection control within the hospital reduces
- Disease and death due to reuse and repackaging of infectious disposables is eliminated
- Low incidence of Occupational health hazards
- Segregation and appropriate treatment of medical waste reduces cost of waste management and generates revenue

#### **8)Where should I dispose the segregated and treated waste?**

The segregated waste should be treated on site (if the hospital has the provisions) or it has to be given to a common biomedical waste treatment facility provider.

#### **9)Why should I segregate waste?**

There is an urgent need to keep the infectious waste stream separate from non-

**11) What are the hazards to health care personnel?**

- Needle stick injuries, cuts and bruises from blades and other sharp instruments in healthcare establishments can lead to severe infection and death among healthcare personnel.
- Infections can also be contracted due to contact with patients, blood, sputum, urine, stools and other body fluids.
- Allergy due to fumes and particulate matter and hazards while administering radioactive and cytotoxic treatment can also cause disability and death among healthcare workers.

**12)What are Sharps?**

Sharps consists of Needles, Scalpels, Blades, Broken Glass etc., which have the capability to injure by piercing and cutting the Skin.

**13) What is Needle Stick injury?**

Injuries caused by needles are generally known as *Needle stick injuries*

**14) What is Infectious waste?**

Infectious wastes are human tissues, anatomical waste, organs, body parts, placenta, animal waste (tissues/cell cultures), any pathological/surgical waste, microbiology and biotechnology waste (cultures, stocks, specimens of microorganisms, live or attenuated vaccines, etc). cytotoxic pathological wastes are included too, soiled waste (swabs, bandages, mops, any item contaminated with blood or body fluids)

**15) What are Infectious Plastics?**

IV tubes / bottles, tubings, gloves, aprons, blood bags / urine bags, drains in disposable plastic containers, endo-tracheal tubes, microbiology and biotechnology waste and other laboratory waste in disposable plastics

**16) What is Cytotoxic waste?**

This is the waste generated from the treatment of cancerous cells.

**17) What is a Common Waste treatment facility?**

Common Medical Waste Treatment Facility is safe collection, transportation,

**20) Can I handover the General waste of the hospital to the Municipal authorities?**

Yes, you can but only if you have separated it at source and it is not contaminated. Remember, even food waste can be contaminated. So, if you suspect that any kind of waste is contaminated and infectious, first treat it appropriately – not just routinely but make sure the waste is actually decontaminated and no longer a health hazard. Thereafter, you can handover to the municipal authorities. Normally infectious waste cannot be so easily decontaminated within the healthcare establishment and that's the reason the common facility operator picks up your infectious waste and transports it in a safe way to an offsite facility and treats and decontaminates the waste. However, if your HCE has on-site facility/facilities to properly decontaminate and treat the different kinds of wastes generated in your HCE, then you can handover the 'treated' hospital waste to the municipal authorities for secured landfilling.

**20) How do I minimize waste?**

By Source reduction (avoiding wastage), Use of recyclables (e.g. using sterilizable glass ware), Purchasing policy (purchasing non-PVC healthcare equipment), Segregation at source (separating biomedical plastics, glass, metal at source for autoclaving & shredding each category separately before recycling), Stock management (inventorying regularly and replacing IV fluids, blood and drugs so that there is no wastage due to spoilage)

**21) How do I treat the Wastes with Multiple characteristics?**

There are some wastes with *multiple characteristics* that fall into more than one category e.g. 'Radioactive sharps', 'plastic IV tubes with cytotoxics'. They need to be managed with caution. These wastes should be treated first for the *hazardous waste* component, and once the hazard is removed, then it can be treated as infectious metal sharps, glass, plastic, pathological etc., and treated accordingly.

**22) What happens if Plastics are dumped in an Incinerator?**

Plastics, especially chlorinated plastics, when incinerated at low temperature release toxic carcinogenic gases like Dioxins and Furans

**23) What if my health care establishment does not comply with the BMW**

**25) Apart from the segregating and disposing aspects, do I have to maintain any Records?**

1. An Annual Report has to be submitted to the State Pollution control board by 31<sup>st</sup> Jan every year, to include the categories of waste and their quantification. So this involves daily quantification of waste. The Air and Water Consent forms should also be filed.
2. Every authorized person has to maintain records related to generation, collection, reception, storage , transportation, treatment, disposal and/or any form of handling of biomedical waste, and be subject to inspection and verification at any time.
3. If any accident occurs at any institution or the site, the authorized person ... shall forthwith record in the stipulated form.
4. Payment of Authorisation fee

**26) What is Authorisation fee?**

This is for grant of authorization for generating waste, which has to be treated later. The Authorisation is granted for a period of 3 years, or the case may be, including an initial trial period of one year from the date of issue by the State Pollution Control boards.

**27) Who is Prescribed Authority?**

The State Pollution Control Board is the Prescribed Authority (in case of states) and Pollution Control Committee (in case of Union territory).

**28) Should I use a plastic liner?**

Yes, if it is infectious waste, the general waste could be disposed in cardboard boxes.

**29) How do I dispose Sharps?**

Sharps should be contained in a Sharps pit, or could be encapsulated in Plaster of Paris, Concrete etc.

**30) Hospital waste management - who's responsibility is it anyway - doctors? nurses?, cleaning staff?**

It is a collective initiative and shared responsibility of all viz., doctors, nurses, cleaning staff, all employees and administrators.

**34) What about Radioactive waste?**

Radio active waste from medical establishments may be stored under carefully controlled conditions until the level of radioactivity is so low that they may be treated as other waste. Special care is needed when old equipment containing radio active source is being discarded. An expert advice should be taken into account.

**35) What about mercury control in Health care facilities?**

The solid wastes containing Mercury due to breakage of thermometer, pressure and other measuring equipment in HCUs need to be given proper attention not only in respect of the collection of the spilled mercury , its storage and sending of the same back to the manufacturers, but also taking of all measures to ensure that the spilled mercury does not become part of biomedical wastes or other solid wastes generated from HCUs. As per Schedule -2 of Hazardous Waste(management & Handling)Rules, 2003, any waste containing equal to or more than 50 ppm of mercury is a hazardous waste and the concerned generators of the wastes including the HCUs are required to dispose the waste as per the HW Rules.

<b>Name &amp; Address of CBWTF with phone number</b>
Distro Med Services, Kuvadava, GIDC, Plot No:- 272,273, Rajkot. Ph. 0281-2225233
Semb Ramky Environmental Management Private Ltd. Plot No.: 28, Ashwamegh, GIDC, Changodar, Dist. Ahmedabad. 079-6304248/6301520
Care BMW Incineration At & Post- Santaj Plot 1216, Ta.Kalol,Gandhinagar.Phone no. 7454687 (M): 9825323330
En-vision Engineers (P) Ltd. Bhatar Disposal Site,Surat municipal Corporation Bhatar village, Ta. Surat, Surat,0261- 2470653, 2472374,(M): 94261-18309
Pollucare Biomedical Management Pvt. Ltd. Plot no. 182, Geratnagar, Ta. Duskoii, Ahmedabad(H): 7558070(M): 31053808

Girnar Bio Medical Waste Services.  
Managed By : Sorath Tabibi Sangh.  
Plot No.:1746, GIDC : 2, Dolatpura,  
Junagadh.

