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Indian Standard

(Reaffirmed 1995)

SOLID WASTES — HOSPITALS — GUIDELINES FOR MANAGEMENT

भारतीय मानक

ठोस अपशिष्ट — अस्पताल — प्रबन्ध की मार्गदर्शिका

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FOREWORD

This standard was adopted by the Bureau of Indian Standards on 28 February 1989, after the draft finalized by the Solid Wastes Sectional Committee had been approved by the Chemical Division Council.

Solid wastes generated from medical establishment need to be handled very carefully as these wastes may contain infectious material. Different types of solid wastes are generated in hospitals which need different types of handling. Now-a-days, hospital wastes are more explicitly termed as health care unit wastes. Thus, the hospital waste management system should be operated very carefully and methodically to avoid serious consequences. Hospital wastes can be broadly grouped into two types:

a) Solid wastes consisting of materials likely to transmit infection, and

b) Solid wastes which are normally safe to handle but may get infected as they are produced in hospital premises.

Obviously, the first category of waste needs very careful handling and disposal while the waste of second category can be handled in a normal manner with a precaution that they are not mixed with the infectious material. In either case, contact with the wastes by the workers should be avoided.

This standard does not cover wastages arising out of health care units or medical establishments that service or manufacture health care devices or medical devices.

Indian Standard

SOLID WASTES — HOSPITALS — GUIDELINES FOR MANAGEMENT

1 SCOPE

This standard prescribes guidelines for management of solid wastes from hospitals.

2 REFERENCE

The Indian Standard IS 9569 : 1980 'Glossary of terms relating to solid wastes' is a necessary adjunct to this standard.

3 TERMINOLOGY

For the purpose of this standard, definitions given in IS 9569 : 1980 shall apply.

4 SOLID WASTES

4.1 The hospital wastes can be categorized in the following manner.

4.1.1 *General Waste*

This includes domestic type of waste, packing material, non-infectious animal bleeding, garbage from hospital kitchen and other waste materials which do not pose a special handling problem or hazards to human health or environment.

4.1.2 *Chemical Waste*

This waste comprises material discarded from diagnostic and experimental work and cleaning, house-keeping and disinfecting work. This may contain hazardous animal wastes for which special precaution is needed in handling.

4.1.3 *Pathological Waste*

This waste consists of tissues, organic body parts and human foetuses. This may be infectious waste material.

4.1.4 *Highly Infectious Waste*

This contains pathogens in sufficient quantity and exposure to it could result in disease. This category includes cultures and stock of infectious agents from laboratory work, waste from surgery and autopsies on patients with infectious diseases, wastes from infected patients in isolation wards, wastes that have been in contact with animals inoculated with an infectious agent, etc.

4.1.5 *Sharp Objects*

These include needles, syringes, scalpels, blades, broken glasses, nails and any other type of materials which can cause puncture.

4.1.6 *Pharmaceuticals Wastes*

This includes pharmaceutical products, drugs and chemicals that have been returned from wards, or having spilled or are out-dated or contaminated or discarded for any other reasons.

4.1.7 *Pressurized Containers*

This includes those containers used for demonstration or instrumental purposes containing innocous or inert gas and aerosol cans which may explode if incinerated or accidentally punctured.

4.1.8 *Laboratory Waste*

This includes wastes which arise during storage, used and spillage of solid drugs and chemicals which may be toxic or contaminated.

5 HAZARDS OF HOSPITAL WASTES

5.1 Effects of hospital waste exposure are normally considered in two ways.

5.1.1 *Occupational Hazards and Health Risks*

Persons who are liable to be exposed to these health hazards can be classified in two categories:

a) Patients and personnel in the hospital; and

b) Personnel in the organization providing support services on contract basis, namely, milkmen, laundrers, sweepers, etc.

5.1.1.1 In general, there is insufficient awareness of health hazards associated with contaminated or infectious wastes. The health of all the workers working in or associated with the hospitals can be at a risk and it is important that they may be made aware of the risk and be trained in precautionary measures and disposal procedure.

5.1.2 *Impact of Hospital Waste on Human Health and Environment*

Whenever the hospital wastes are mixed with the municipal wastes, strict precaution is necessary in handling the mixture. All types of hazards due to contamination are possible. General wastes can be disposed of by landfilling while infectious waste should be disposed of in specially designed incinerators.

5.1.2.1 *Incinerator emissions are potential sources of air pollution*

Adequate air pollution control equipment is an essential requirement for such type of incinerators.

6 GENERATION OF HOSPITAL WASTES

All these types of wastes can arise in a wide range of health care establishments, namely, hospitals, clinics, long term health care premises, maternity homes, etc. The quantity of waste produced can be estimated to be about one to two kg per bed per day. It may be mentioned here that the quantities in USA are as high as four to five kg per bed per day, mainly due to common use of disposal item. These quantities are expected to increase with the passage of time. It is necessary to plan for storage of twice the expected quantity to take care of unforeseen situation. It is also suggested that a better correlation be obtained by equivalent population computed from total number of patients, residence of part time staff members and estimated visitors load.

7 COLLECTION OF THE WASTES

7.1 It is desirable that these wastes are collected and stored separately in containers of adequate capacity so that there is no spillage during transport. The storage should preferably be in closed containers. Waste which contains lesser moisture or is mostly dry can be stored in paper or plastic bag. This bag should be such that it can be safely sealed after use. The material and thickness of the bag should be such that it should not tear off during handling. Wastes should be stored in plastic or metal container fixed on a stand with a foot operated lid. It should be possible to clean and wash the container thoroughly. Paper bag should not be recycled and should be disposed of along with the contents. Organic wastes should be disposed on the same day to avoid problems of odour, transfer of infections, etc.

7.1.1 The use of single service container reduces odour and noise produced during transfer of the material and achieves better control on operation. Metal or plastic container needs to be cleaned and washed by hot water at regular frequencies.

7.1.2 In many places, trash chutes are provided so that the waste movement is free from human contact and solid waste from various places in the same premises can be collected at one place.

8 TRANSPORTATION AND DISPOSAL

8.1 Transportation

Internal and external transfer of hospital wastes should be considered an integral part of the hospital waste management system. Internally, waste is usually transported from its initial storage point to an assembly area or on site incinerator by means of trolley and hand carts. Such equipment should be cleaned regularly and used only for waste transport. Waste being transported externally should present no public health risk provided it has been treated. It is also necessary to mention here that its physical appearance may give rise to objections by the public. Transport vehicle should have an enclosed air tight body and should be cleaned after its use and disinfected regularly.

8.2 Disposal of Hospital Waste

The hospital waste should, as far as possible, be disposed of by the hospital authorities themselves, preferably on their own premises. Even such wastes which are not normally infectious, such as, used medicine bottles or syringes, are likely to be misused, if sold with the labels intact and hence should be carefully destroyed. The garbage fraction can go to municipal waste disposal site but should be transported quickly and carefully. The remaining waste should, as far as possible, be burnt in the incinerator but normally as the hospitals are supposed to have incineration for destruction of obnoxious waste, all other types of waste can be burnt in this incinerator. Incinerators used for hospital waste are of two types:

a) Natural draft incinerators, and
b) Forced draft incinerators.

8.2.1 The natural draft incinerators are operated in the range of 500 to 700°C and may be able to burn the combustible wastes. However, pathological autopsy and surgery waste requires complete destruction at 700 to 900°C which can be better achieved in forced draft incinerator.

8.2.2 Chemically pathological waste is composed principally of carbon, hydrogen and oxygen. Slight amount of many minerals along with trace of nitrogen are also present. Physically, this material consists of cellular structured material and fluids. Each cell contains water, along with elements and compounds forming the cell. The cell comprises fatty tissue, proteinaceous tissue and bone in proportion varying with different animals. Blood and various other fluids in the organs are almost completely equivalent to water. Any fluid waste, wherever necessary, is first converted as solid, and then suitably disposed.

9 AIR POLLUTION CONTROL

9.1 Pathological waste incinerator can produce emission of fly-ash, smoke, gases and odours that could be highly objectionable. Fly-ash emissions may be very high. Visible smoke from this type of incinerator is highly repugnant on aesthetic grounds to most people and is specially undesirable from crematory furnaces.

9.2 Normally, the prevention of air contaminant emissions by good equipment design is the best air pollution control procedure to follow. Inadequate equipment may be compensated for by the use of an after burner.

10 SITE DISPOSAL BY LANDFILLING

Special landfills are reasoned for disposal of hospital waste. During landfilling, some precautions have to be taken such as:

a) The low lying areas prior to landfilling have to be made leakproof by using special technique to avoid any leaching out of the hazardous contents of the wastes.

b) Workers at site should use all protective equipment, and such as, clothes, gum boots, and hand gloves for their protection.

c) There should be frequent spraying of insecticides.

d) The sites should be isolated from the residential locality.

11 PLANNING OF HOSPITAL WASTE MANAGEMENT

11.1 It is necessary to have careful survey for effective planning of hospital waste management. As the activity is essential and necessary for every hospital, careful planning is required whenever the hospital is renovated or a new hospital is to be established. The types of quantities of different kinds of waste which are expected to be generated need to be estimated. In estimation of these quantities, due consideration should be given to the type of medical establishment, number of beds for indoor patients, facilities for outdoor patients, pathological laboratories and other facilities.

11.2 Waste storage methods and the requisite facilities should be chosen, for example, extent of waste separation, storage bins, bags, and their locations. Storage areas for different departments should be selected. This is essential as primary storage bin has to be designed. For transfer of waste from primary storage to secondary storage, the wheelbarrows or any such equipment should be designed. In such a planning, the following points should be borne in mind:

a) Adequate access for vehicles to service areas;

b) Washing and cleaning facilities;

c) A minimum of 24 hours storage capacity specially for secondary storage facility; and

d) Need for power supply, water supply and drainage to waste disposal areas.

11.3 It is necessary to decide policy for waste treatment and disposal during planning stage. Options can be as follows:

a) On site incinerator or transport to a central hospital waste incinerator;

b) Incineration of all the waste or only selected waste, namely, pathological waste;

c) Feasibility and desirability of automation in internal waste handling method; and

d) Separate sanitary landfilling of hospital waste.

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