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DRAFT TANZANIA STANDARD

Biotechnology - Guidance for handling, inactivating and testing of waste Part 1: Laboratories for research, development and analysis

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0 Foreword

This Tanzania Standard was developed to minimize the risks associated with the collection, storage, packaging, intra-laboratory transport, treatment and disposal of waste including effluent and those arising from the treatment for re-use or recycling of contaminated items, equipment and materials.

This Tanzania Standard aims to harmonize the treatment of waste containing hazardous organisms. More extensive national and international legislative provisions should be observed. The principles for laboratories established in this draft Tanzania Standard are consistent with those relevant to large scale biotechnology processes (Part 2).

The presence of hazardous organisms among the waste and the way in which it is handled should be determined by risk assessment in accordance with the national regulations.

During the development of the standard, assistance was derived from the following documents:

- BS EN 12740:1999 Biotechnology - Biotechnology - Laboratories for research, development and analysis - Guidance for handling, inactivating and testing of waste, published by British Standards Institute (BSI).

1 Scope

This Tanzania Standard gives guidance on methods for handling, inactivating and testing of waste containing organisms from biotechnology laboratory activities and processes.

This Tanzania Standard applies to wastes that may be generated by biotechnology, clinical, molecular biology, microbiology and other laboratories in activities where organisms are handled, genetically modified organisms are created or used or by laboratory processes involving material of human, animal or plant origin.

This Tanzania Standard does not apply to other types of waste or waste from human health care or other medical treatment activities.

2 Normative References

The following referenced documents are indispensable in the application of this Tanzania standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies:

No normative reference for this standard

3 Terms and definitions

For the purposes of this Tanzania standard, the following terms and definitions should apply:

3.1 biohazardous waste

biological waste which can cause hazard

3.2 decontamination

removal or reduction of microbiological hazard to an acceptable level

3.3 disinfectant

chemical agent which is able to reduce the number of viable microorganisms

3.4 disinfection

process of reducing the number of viable microorganisms by various physical and chemical methods

3.5 disposal

intentional and final burial, deposit, discharge, dumping, placing or release of any waste material into or on any air, land or water

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3.6 hazard

intrinsic potential property or ability of something (e.g. any agent, equipment, material or process) to cause harm. Note: Harm is an injury or damage to health of people and/or to the environment.

3.7 inactivation

partial or full destruction of a given activity up to destruction of the microbiological system

3.8 microorganism

any microscopic biological entity, cellular or non-cellular, capable of independent replication or replication within host cell,

3.9 monitoring

regular or continuous observation or collection of data with respect to an. organism, process or procedures

3.10 organism

biological entity capable of replication or transferring genetic material

3.11 risk

probability of occurrence of a hazard causing harm and the degree of severity of the harm

3.12 sharps

items whether intact or broken which may cause lacerations or puncture wounds

NOTE: Examples of sharps are hypodermic needles, disposable blades, forceps, knives, probes, scalpels and Scissors', glass pipettes, slides and cover glasses, broken glass or plastic ware.

3.13 sterile

state of being free from viable microorganisms

NOTE 1 In practice no such absolute statement regarding the absence of viable microorganisms can be proven. However, sterile conditions can be regarded as established by using an accepted or recognized method of sterilization.

NOTE 2 The process of inactivation of viable microorganisms during a sterilization procedure is usually described by an empirical mathematical function, commonly an exponential functional. By their mathematical nature, such functions can be reduced to very low numbers, but not to zero. However, these empirical functions can be applied to control or assess the process parameters of a sterilization procedure to realize a desired degree of inactivation of viable microorganisms.

3.14 sterilization

process used to reach a sterile state

3.15 validation

documented procedure for obtaining, recording and interpreting the results needed to show that a process will constantly yield a product complying with predetermined specifications

3.16 waste

by-product arising from a process or unwanted substance or article derived from any activity

NOTE Examples of waste are scrap material, effluent, unwanted residue or surplus arising from any process or activity or any substance or article which is discarded or to be disposed of as being broken, contaminated, spoiled, or worn out.

4 Waste management

4.1 A documented waste management policy should be established describing the measures for the prevention, minimization, segregation, handling, storage, treatment, transportation and final disposal of biohazardous waste from laboratory activities. The policy should commit the laboratory to minimize the production of-waste and where possible the recovery of materials. The waste management system should be part of the overall risk assessment of the laboratory's activities. This should assure that it is appropriate to the work carried out and the wastes generated.

4.2 The waste management policy and system and the responsibilities and duties allocated to laboratory managers, researchers and technical personnel should be specified in a waste management plan. The arrangements for effective control of biohazardous waste should be integral with the general management and supervisory organization.

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4.3 Documented operational procedures describing the methods used for effective waste management should be established. These documents should be reviewed at regular intervals and updated if necessary.

4.4 A description should be given of the methods and procedures for handling, inactivating and treating biohazardous waste under both normal conditions and deviations. Procedures should also be described for the commissioning, maintenance and use of plant and equipment used for waste treatment in accordance with appropriate Tanzania Standards and guidelines.

4.5 Comprehensive information should be provided on the risks to human health and safety and to the environment arising from waste which contains organisms together with details of its treatment and the prevention and control measures used in normal procedures and in emergencies. This information should be understandable to technical and non-technical personnel alike.

4.6 The quality of the waste management system should be assured by periodic monitoring of the various arrangements and procedures. These include operating conditions and control devices of laboratories and equipment, the composition and characterization of the waste loads and adherence to approved standard operating procedures. Test and inspection results should be documented together with details of any action taken to correct deviations from the intended operating conditions.

5 Segregation of waste

5.1 The following essential elements with regard to the segregation of waste should be considered during risk assessment of the laboratory's activities and should be included and documented:

i) identification of wastes which need different treatment methods;
ii) methods for the segregation of biohazardous from non-biohazardous waste at the point of origin, if possible;
iii) methods for the segregation of other categories of waste (such as hazardous chemical or radioactive products) which do not contain organisms when there is incompatibility with the biohazardous waste treatment methods.

NOTE 1 Combination wastes containing biological and other hazardous materials (e.g. toxic chemicals and radioactive substances) should need special attention. For example, for biological and radioactive waste the risk to be first treated should be determined by risk assessment.

NOTE 2 In cases of small quantities of waste and in laboratories of containment level 3 or 4, segregation may not be useful.

5.2 Segregation methods or procedures including designated containers for the waste should facilitate differentiation and identification of the wastes streams and prevent the inadvertent mixing of the various types.

NOTE 3 Hazardous and non-hazardous wastes which do not contain organisms will generally be subject to other national legal controls and should be handled accordingly.

NOTE 4 Segregation of wastes at the point of generation can reduce the risk of exposure of waste handlers to organisms and by preventing the contamination of other wastes by such agents reduce the total quantity of biohazardous waste generated by the laboratory.

6 Waste containers

6.1 Containers used for the collection of biohazardous waste in the laboratory should be selected after consideration of the following factors and, where appropriate, specifying validated methods for decontaminating containers:

i) the nature of the waste as a liquid, slurry, solid or a sharp;
ii) the handling and transportation methods and procedures;
iii) the treatment methods for the waste;
iv) the decontamination of the container for re-use;
v) the means of identifying different wastes;
vi) the ability to provide the necessary degree of physical containment.

6.2 Adequate supplies of containers should be provided so that the waste can be discarded immediately into an appropriate container to eliminate subsequent sorting, repackaging and other handling operations.

NOTE 1 Considerations relating to containers for sharps, liquid and solid waste are given in annex A.

6.3 Suitable means should be provided to identify the containers for different waste types, for example by colour coding, permanent and legible wording or securely fixed and clearly worded labels.

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6.4 In the case of re-usable containers, the colour coding or labels should be unaffected by any decontamination process.

6.5 The container or its label should be marked with the international biohazard sign, unless it is used only for waste from containment level. There should be an effective closure device or means for sealing the container so as to maintain containment during subsequent handling.

NOTE 2 Closure devices include, for example, integral closure devices, plastics or wire ties, and thermal sealing devices.

6.6 Containers should be made of a material which is permeable to the sterilant if the contents are to be sterilized with steam or gaseous fumigant or constructed in such a way that the sterilant is able to penetrate the load. Biohazardous waste containers should not be used for other waste items, materials or substances.

NOTE 3 Containers for laboratory waste should conform to national regulations with regard colour coding, materials of construction, shape and size

7 Waste collection

7.1 General requirements

7.1.1 Waste should be inactivated or rendered safe before final disposal or discharge. If treatment is not undertaken within the laboratory the waste should be conveyed in sealed robust containers to a separate treatment area and in accordance with any packaging and transport requirements for off-site conveyance.

7.1.2 Waste containers should be removed from the laboratory when their safe capacity has been reached or at periodic intervals and transported to a storage or holding area pending treatment or disposal. An external decontamination of containers should be carried out according to the level of risk.

7.2 Waste conveyance and transport

Wheeled appliances used for the collection and on-site transportation of waste containers should be designed and constructed to:

i) enable the containers to be easily loaded, secured and unloaded;
ii) prevent damage to the containers from rough or sharp surfaces or from sharp protuberances which may puncture the containers;
iii) be easily cleaned and decontaminated;
iv) be easily moved and maneuvered.

8 Storage of waste

Storage should apply only to waste from containment levels 1 and 2 awaiting off-site conveyance for treatment and disposal. Waste containment from level 3 may exceptionally be stored for a short period of time if an autoclave is not immediately accessible. The design, construction and facility requirements for a biohazardous waste store and according to the level of risk, should be such that

i) the store is a clearly designated area separated from the work space;
ii) the store is separated away from delivery or storage areas for in-coming goods and from any areas used for food storage, preparation or consumption;
iii) where appropriate, access to the store is such that waste collection appliances can be wheeled inside for unloading and that vehicles can safely and conveniently approach to remove waste for off-site treatment and disposal;
iv) the methods and materials used in the construction enable the store to be easily cleaned and decontaminated;
v) where appropriate, the store should be physically secure to prevent access by unauthorized persons and to prevent entry by animals and infestation by insects or rodents;
vi) at containment level 2 and higher, the store for biohazardous waste is marked with the international biohazard symbol and has a clearly printed and permanent sign displayed at the entry.

NOTE: Where only small quantities of waste are generated by the laboratory, it may be inappropriate to provide a separate store or storage area. In such cases a suitable and clearly defined area of the laboratory should be designated for waste storage and heavy-duty rigid containers provided to accommodate the waste. Alternatively, refrigerators or freezers within the laboratory may be reserved for waste storage.

9 Selection of treatment methods

9.1 General

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9.1.1 Biohazardous waste should, if required, be inactivated or rendered safe before final disposal or discharge. The decision to treat biohazardous waste and choice of treatment method should be determined in accordance with the following considerations:

i) the type and nature of the waste material;
ii) the hazard of the organisms in the waste;
iii) the efficiency of the treatment method;
iv) the operating conditions of the treatment method.

9.1.2 The treatment method should be amenable to validation, should be independent of any packaging and should be monitored.

NOTE: Monitoring can involve sampling and analysis or testing of the effluent for hazardous organisms or the use of suitable physical engineering or other process controls to demonstrate effective operation within the prescribed operating criteria.

9.1.3 Treatment of the waste should be validated with regard to the inactivation of the organisms and the inactivation of any residual contamination of the packaging or containers. Different waste treatment methods can be used (see Table 1).

Table 1 - Examples of waste treatment methods related to the type of waste

Treatment	**Type of waste**		
	Gas	**Liquid**	**Solid**
Thermal	X[1)]	XXX[3)]	XXX
Chemical	XX[2)]	XX	XX
Irradiation	X	X	X
Incineration	XX	X	XXX
Filtration	XXX	X	*N/A*[4)]

[1)] X possible.

[2)] XX appropriate.

[3)] XXX Recommended.

[4)] N/A Not applicable.

9.1.4 The process should not significantly increase the risk of exposure of laboratory staff or other waste handlers to the hazard itself or to other risks from the concomitant hazardous agents, equipment and substances which are employed in the treatment.

9.2 Treatment methods

9.2.1 General

9.2.1.1 The validated chemical and physical methods for the treatment or inactivation of waste include:

i) steam sterilization;
ii) chemical disinfection/sterilization;
iii) dry heat sterilization;
iv) other methods.

9.2.1.2 The relative effectiveness of these and other treatment methods depends on a number of factors including the volume, concentration, type and hazard caused by the organisms (and the physiological state), the diffusion resistance of the material to be disinfected and the operating parameters and conditions of the treatment method. In general, steam sterilization should be preferred to treat biohazardous waste from containment levels 2 and 3 and should be used to treat all waste from containment level 4. Thermal methods are generally easier to validate and monitor than chemical treatment and are less damaging to the environment.

9.2.1.3 Methods other than steam sterilization should be selected only if this is impracticable or inappropriate. For example, contaminated laboratory equipment, fixtures and furniture which cannot readily be removed may be effectively treated using a gaseous fumigant such as formaldehyde or ethylene oxide (under special circumstances). Also, for effluent from veterinary research special treatment methods may be necessary

NOTE: These methods for treatment can be used alone or in combination according to the risk assessment requirements and/or discharge consent standards to enable the waste to be inactivated and safely discharged.

9.2.2 Steam sterilization

9.2.2.1 Steam sterilizing or autoclaving is the exposure of waste to saturated steam under pressure in a pressure vessel or autoclave. Autoclavable waste containers should be of a design and material, which allows steam to penetrate the load. They should have sufficient stability and resistance to the maximum operating temperature and pressure.

9.2.2.2 In addition to any devices such as gauges or indicators which measure and record the basic operating criteria (e.g. temperature, vacuum, pressure), a biological or chemical indicator should be placed in the waste load for validation to indicate that the necessary sterilization conditions have been achieved.

9.2.2.3 The operational parameters, e.g. time, pressure and temperature, should be maintained and checked during the sterilization cycle. While the temperature and time depend upon the total volume of the material to be treated, the number and type of organisms and their resistance against steam, it is necessary first to remove all of the air from the autoclave, the waste and waste containers to ensure that the required sterilization temperature will be maintained.

NOTE 1 In the case of closed containers included in waste material the validation should take place within the material being sterilized.

9.2.2.4 Sterilization should only commence when the air has been removed from the autoclave and the operating temperature has been reached.

9.2.2.5 The potential of complete air removal is affected by factors such as the type of waste, the amount of waste, the packaging, the water content of the waste, and the form and material of the container. The whole treatment process including loading, the load, suitability of packaging or container, air removal and filtration and liquid effluent discharge should be validated.

9.2.2.6 A record should be retained of all monitoring, maintenance and performance tests carried out on the autoclave together with a logbook or similar record of all routine disposals including the temperature charts and details of the load. When appropriate, air removed from the autoclave should be discharged into the environment after passing through a microbiologically validated filter.

9.2.2.7 Details of sterilization procedures, including the operational parameters and conditions, should be written down as a standard operating procedure document or operating manual which is to be used by all waste handlers. The document should be kept under review.

NOTE 2 A suitable biological indicator for steam sterilization is the spores of *Bacillus stearothermophilus*

NOTE 3 Autoclaving may not change the visible appearance of the waste and it may be necessary to distinguish treated from untreated waste by careful removal or obliteration of biohazard warning labels from treated containers or by labelling such containers as "autoclaved" or "sterilized". Alternatively, chemical indicators may be added to the load to indicate that the load has been autoclaved.

NOTE 4 Aesthetic concerns may require that the autoclaved waste is further treated to render it acceptable for final disposal, e.g, if the waste contains human or animal material or tissue.

NOTE 5 Autoclaving may not remove or reduce the non- biological hazards arising from the presence of chemical or physical agents or other materials in the waste.

9.2.3 Dry heat sterilization

9.2.3.1 Dry heat sterilization is the exposure of the waste to heat at a temperature and for a time sufficient to ensure sterilization of the entire waste load.

9.2.3.2 The sterilization process should be monitored by the addition of a suitable indicator or measuring device to the waste load and where appropriate by monitoring the organism(s) present in the waste.

9.2.3.3 The sterilizing unit or equipment should incorporate a suitable thermal cut-out device which is independent of the temperature indicating or monitoring device.

9.2.4 Chemical disinfection/sterilization

9.2.4.1 This method involves the exposure of waste to chemical agents which possess antimicrobial activity.

9.2.4.2 General disinfectants may not inactivate organisms such as spores, some fungi and viruses and should not be used as the principle treatment method unless thermal procedures are inappropriate because of the nature of the waste or contaminated material.

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NOTE 1 Thermal sterilization should be preferred to chemical disinfection for reasons of efficacy and environmental considerations.

9.2.4.3 The choice of an appropriate chemical agent and conditions of use should be determined by the risk assessment taking into account the identity of the organism(s) to be treated, the nature of the waste and the presence of organic, protein or particulars matter and the nature of the surfaces, items or equipment which will be exposed to the chemical disinfectant.

9.2.4.4 Chemical agents should be used at the manufacturers' recommended concentrations and exposure times according to the requirements and conditions of use. The chemical agent selected should be compatible with other substances or materials that may be present in the waste load so that its efficiency is not reduced and also to ensure that toxic or hazardous products are not thereby formed nor released.

NOTE 2 The efficiency of any chemical agent against a particular organism or types of organism may be confirmed by reference and adherence to manufacturers' data and instructions.

NOTE 3 Ethylene oxide, formaldehyde (alone or with low temperature steam) and certain other agents may be used as gaseous fumigants particularly for equipment and items that should be treated *in situ.*

9.3 Other treatment methods

Other waste treatment methods are available but are not yet validated for general use and have only limited application. These include:

a) irradiation (e.g. with microwave, gamma and ultraviolet radiation);
b) other treatment methods (e.g. thermal pyrolysis, encapsulation and filtration). If such methods are used, validation and monitoring procedures should be performed.

10 Disposal methods

10.1 General

10.1.1 The options available for the disposal of waste and waste effluent which cannot be recycled or re-used following treatment are:

i) incineration;
ii) landfill;
iii) discharge to the sewer system.

10.1.2 The selection of an appropriate option should be based on a number of considerations including:

i) the nature of the waste itself and its intrinsic hazard;
ii) whether the waste has been inactivated by a reliable and validated method;
iii) the aesthetic acceptability of the discharged
iv) the potential deleterious effect of the discharged waste on the environment;
v) the ease and reliability of the disposal method;
vi) the disposal and other costs;
vii) the general occupational hazards and risks to waste producers, handlers and operators; and
viii) the overall impact of the disposal or discharge plant or equipment on the local and general environment.

10.2 Incineration

10.2.1 Incineration may be used as a method for the treatment and disposal of biohazardous waste.

10.2.2 Waste which has not been previously treated to inactivate it or to render it safe should be incinerated in plant suitably designed and operated for the destruction of hazardous clinical or special waste

10.2.3 Biohazardous waste which has not been inactivated or treated should be conveyed or transported to the incinerator in suitable containers.

11 Testing and validation of waste treatment methods

11.1 General

11.1.1 The selected treatment option is required to inactivate or render safe the hazardous component of the waste according to the risk assessment It should be possible to validate the treatment method to verify that the number of viable organisms in any waste or effluent are within acceptable discharge levels or that the organism is destroyed.

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11.1.2 Where the waste treatment method is one that conforms to an appropriate national standard its validation will be dependent on the strict adherence to specified procedures including any operational sampling, monitoring and performance tests undertaken to confirm that the treatment process proceeds as intended. These should be carried out in the prescribed manner and at the required time intervals and a record of the relevant measurements and test parameters should be kept.

NOTE 1 Validation of any waste treatment process may also involve the periodic checking by verification tests for the presence of viable organism(s) in the waste. Appropriate statistical methods can be used to make inferences from these tests to overcome difficulties in verifying that the treated waste or effluent contains zero viable organisms.

11.1.3 Where a range of wastes from different containment levels and other characteristics are encountered the treatment method should be validated for operational effectiveness under "worst case" load conditions. The "worst case" comprises the maximum mass or volume capacity of a realistic mixture of intractable wastes based on the types of waste generated by the laboratory. The operational conditions and parameters necessary to inactivate the "worst case" load should be used as the basis to define the normal operational procedures for mixed wastes.

NOTE 2: Tests carried out to check the concentration of viable organisms in the treated waste may be either growth related or non-growth related**.** The method chosen will depend on the composition of the waste. For example, direct methods may be appropriate for testing waste streams with a low concentration of viable microorganisms and indirect methods where the concentration is high.

11.2 Testing of treated waste and waste effluent

11.2.1 The efficiency of the treatment method can be checked by assaying tile waste before and after treatment for the presence of viable organisms or by methods which detect DNA disruption. Samples of the treated waste to be assayed should be taken from different parts of the load for examination under aseptic conditions.

11.2.2 Effluent from waste treatment processes which is discharged directly to air or the sewer system should be periodically tested as required by the relevant national or local consent authorities or to ensure that the numbers of organisms are within permitted levels and there is no significant environmental risk.

11.2.3 The test methods and procedures used to assay treated wastes for the presence of viable organisms should be undertaken in accordance with national standards.

NOTE 1 Details of viability testing methods are available in standard reference texts.

NOTE 2 Testing of waste discharge and effluent from treatment plant or equipment may be carried out continuously, or at periodic or irregular intervals, e.g. as random quality control checks. Tests should be carried out at frequent intervals if there is a likelihood of plant malfunction which would release untreated waste to the environment or if the plant is operating at or very near to capacity.

NOTE 3 In cases where biological indicators are less resistant than the organism that is being handled, the organism itself should be used as the test model.

11.3 Calibration of measuring and monitoring devices and equipment

All devices and equipment used to measure or monitor the performance of the treatment process or any discharges or emissions from any process should be calibrated.

NOTE: This can be done using national standard test or by a method which employs an independent or reference test device or probe which is calibrated against a National standard. Calibration of measuring and monitoring devices and equipment should be undertaken at least annually or as required by the standard.

12 Risk management

12.1 Risk assessment

12.1.1 Microorganisms are classified with respect to human health and harm to the environment according to national or international classification schemes.

12.1.2 A documented risk assessment should be made for the biohazardous waste handling activities and treatment processes taking account of the classification of the microorganisms that are involved. The assessment should be reviewed and revised, if necessary, at the different stages of the process design and implementation, if significant process changes are proposed and at periodic intervals

12.1.3 In the case of activities involving exposure to several categories of microorganisms which may be present in the waste the health and environmental hazards presented by each microorganism should be considered in preparing the assessment.

12.2 Selection of containment measures

12.2.1 General

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Assessment of the organisms and characterization of the waste should enable appropriate containment measures to be applied (see Table 2). Attention is drawn to relevant national and international regulations.

Table 2 - Physical containment levels for waste from biotechnology laboratory operations

Relevant treatment[1]	Physical containment level			
	1	**2**	**3**	**4**
Treatment of exhaust gases	No[2)]	Minimize release	Prevent release	Prevent release
Effluent from sinks and showers collected and inactivated before release	No	No	Optional[3)]	Yes[4)]
Treatment of waste	No	Minimize release	Prevent release	Prevent release

[1)] When using this table, attention is drawn to existing national regulations concerning the requirements within a biotechnological area.

[2)] No: No special requirement for

[3)] Optional: Should be decided case by case basis subject to risk assessment, the extent to which these

[4)] Yes: Requirement.

12.2.2 Containment level 1

For waste from containment level 1 laboratories, the principles of good occupational safety and hygiene should be observed. There are no special requirements for dealing with organisms and waste at this level.

12.2.3 Containment level 2

Waste from containment level 2 laboratories should be treated so as to minimize the release of viable organisms. National health, safety and environmental protection regulations should also be followed.

12.2.4 Containment level 3

Waste from containment level 3 laboratories should be treated so as to prevent the release of any viable organism. Effluent from sinks and showers should be inactivated before release if appropriate.

12.2.5 Containment level 4

All waste and effluent from containment level 4 laboratories should be inactivated before removal. Special safety measures should be set case by case according to risk assessment

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Annex A

(informative)

Considerations for waste containers

A.1 containers for sharps

Containers for discarded sharp should be:

i) Puncture resistant so that it is penetrated by the contained sharps in normal use and treatment;
ii) Impermeable so that residual liquid will be contained during normal use and treatment;
iii) Sufficiently rigid so that containers retain their shape, puncture-resistance and impermeability during normal use and treatment;
iv) Provided with a handle which enables the container to be lifted and carded safely;
v) Clearly marked with words “contaminated sharps only”

A.2 containers for solid waste

A.2.1 Containers for solid biohazardous waste should be:

i) Impermeable so that residual liquid does not escape during normal use and treatment;
ii) Strong enough to contain the intended load without breaking;
iii) Provided with suitable closures or able to be sealed effectively to maintain the required containment integrity and impermeability;
iv) Made of materials compatible with the intended treatment method.

A.2.2 In the case of containment level 3 and 4 laboratories rigid containers only should be used for solid waste.

A.3 containers for liquid waste

A.3.1 Containers for liquid waste should be:

i) Impermeable so that liquid will not leak from the container during normal use and treatment;
ii) Of sufficient rigidity and strength to contain the intended load;
iii) Made of materials which are compatible with the intended treatment method;
iv) Provided with suitable closures or able to be sealed effectively to maintain the required containment integrity and impermeability;
v) Able to withstand the intended treatment method without any loss of impermeability, rigidity or strength where re-use is intended.

A.3.2 Containers that are intended to be autoclaved should have closures or sealing devices that can be loosened safely or removed prior to autoclaving.

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