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EAST AFRICAN STANDARD

Management of healthcare waste — Part 1: Management of healthcare risk waste from a healthcare facility

EAST AFRICAN COMMUNITY

Foreword

Development of the East African Standards has been necessitated by the need for harmonizing requirements governing quality of products and services in East Africa. It is envisaged that through harmonized standardization, trade barriers which are encountered when goods and services are exchanged within the Community will be removed.

In order to meet the above objectives, the EAC Partner States have enacted an East African Standardization, Quality Assurance, Metrology and Test Act, 2006 (EAC SQMT Act, 2006) to make provisions for ensuring standardization, quality assurance, metrology and testing of products produced or originating in a third country and traded in the Community in order to facilitate industrial development and trade as well as helping to protect the health and safety of society and the environment in the Community.

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Introduction

In the preparation of this East African Standard, the following source was consulted extensively:

SANS 10248-1:2008, *Management of healthcare waste — Part 1: Management of healthcare risk waste from a healthcare facility*

Assistance derived from this source and others inadvertently not mentioned is hereby acknowledged.

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SOUTH AFRICAN NATIONAL STANDARD

Management of healthcare waste

Part 1: Management of healthcare risk waste from a healthcare facility

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Table of changes

Change No.	Date	Scope

Foreword

This South African standard was approved by National Committee StanSA SC 5140.06M, *National committee for dangerous goods standards – Disposal of healthcare waste*, in accordance with procedures of Standards South Africa, in compliance with annex 3 of the WTO/TBT agreement.

This document was published in May 2008. This document supersedes SANS 10248 (edition 2).

SANS 10248 consists of the following parts, under the general title *Management of healthcare waste*:

Part 1: Management of healthcare risk waste from a healthcare facility.

Part 2: (in course of preparation).

Part 3: (in course of preparation).

Annexes A, B, D and F form an integral part of this document. Annexes C and E are for information only.

Introduction

This part of SANS 10248 presents the basic elements for the management of healthcare risk waste. In this respect certain issues are considered to be of importance for the successful application of this standard, namely

- a) the need to deal with the management aspects of healthcare risk waste in addition to the technical operation of healthcare risk waste disposal,
- b) the need for a document suitable for audit purposes that can be administered to fulfil the needs of the generators which might have greatly varying resources,
- c) the need to control the potential hazards from chemicals, materials that emit ionising radiation and the spread of infectious diseases that can place the public and especially waste disposal workers at risk,
- d) the need for guidelines covering the entire cycle, including waste minimization, point of use disposal through internal and external transportation to final treatment and disposal, and
- e) the need for an environmental management policy.

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Management of healthcare waste

Part 1:

Management of healthcare risk waste from a healthcare facility

1 Scope

This standard lays down minimum provisions for the safe and effective management of healthcare risk waste generated by healthcare facilities and other places where healthcare professionals work in order to reduce potential risks to humans and to the environment. The management of healthcare risk waste covers the generation, the packaging, the treatment and the disposal (cradle-to-grave) of the waste.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies. Information on currently valid national and international standards can be obtained from Standards South Africa.

2.1 Standards

SANS 452, *Reusable and non-reusable sharps containers* (in course of preparation).

SANS 1518, *Transport of dangerous goods – Design, construction, testing, approval and maintenance for road vehicles and portable tanks*.

SANS 10228, *The identification and classification of dangerous goods for transport*.

SANS 10229-1, *Transport of dangerous goods – Packaging and large packaging for road and rail transport – Part 1: Packaging*.

SANS 10231, *Transport of dangerous goods – Operational requirements for road vehicles*.

SANS 10232-1, *Transport of dangerous goods – Emergency information systems – Part 1: Emergency information system for road transport*.

SANS 10232-3, *Transport of dangerous goods – Emergency information systems – Part 3: Emergency response guides*.

SANS 10233 (SABS 0233), *Transportation of dangerous goods – Intermediate bulk containers*.

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2.2 Other publications

Natural Colour Institute (NCS), Scandinavian Colour Institute.

Pantone color formula guide 1000. Moonachie, NJ: Pantone Inc. 1991.

3 Definitions and abbreviations

For the purposes of this document, the following definitions and abbreviations apply.

3.1 Definitions

3.1.1

alternative technology

approved method, technique or process for microbial inactivation or for otherwise altering the biological, chemical or physical characteristics of healthcare risk waste to sterilize such healthcare risk waste by means of technology which do not constitute controlled combustion treatment

3.1.2

approved

acceptable to the relevant approving authority

3.1.3

authorized

approved by the relevant governmental department in accordance with the relevant national legislations and regulations

3.1.4

calorific value

heating value

quantity of heat that is produced when a unit mass of a material undergoes complete combustion under certain specified conditions and expressed in terms of calories or joules per kilogram (MJ/kg for solids and liquids and MJ/m³ for gases)

3.1.5

capacity

optimal quantity of waste that can be processed in a given time under specified conditions, usually expressed in terms of mass per 24 h

3.1.6

chief executive officer

CEO

person responsible for the overall management and control of a healthcare facility

3.1.7

clinical glass

glass that might be contaminated with blood, body fluids or chemicals, e.g. blood collection tubes, laboratory glassware and medication vials

3.1.8

collection

accumulation of wastes from intermediate storage sites for movement to a primary waste holding area or from several primary waste holding areas to the treatment or final disposal site (or both)

3.1.9

colour coding

use of colour on a container or bag or the label attached to such, that serves to identify the category of waste that it contains

3.1.10

container

disposable or reusable vessel in which waste is placed for handling, transportation, storage, or eventual treatment or disposal (or both)

3.1.11

cytotoxic

agent that has a toxic effect on cells, causing cell death or disruption

3.1.12

decontamination

process or mode of action to reduce contamination to a safe level

3.1.13

disinfectant

chemical agent that is able to reduce the number of viable micro-organisms

3.1.14

disinfection

process or mode of action whereby the number of viable micro-organisms are reduced to safe or relatively safe levels

NOTE 1 High-level disinfection is when all micro-organisms, with the exception of small numbers of bacterial spores, are killed.

NOTE 2 Intermediate level disinfection is when *Mycobacterium tuberculosis*, most viruses and fungi are killed, but not necessarily bacterial spores.

NOTE 3 Low-level disinfection is when most bacteria, some viruses and some fungi are killed, but the complete absence of resistant micro-organisms such as tubercle bacilli or bacterial spores cannot be relied on.

3.1.15

disposal

approved deposit, discharge, dumping, placing, or release of any waste material into or on air, land or water in an approved, specified facility, e.g. near surface or geological repository, or the approved direct discharge of effluents into the environment without the intention of retrieval

3.1.16

genotoxic

substance that is capable of interacting directly with genetic material, causing DNA damage that can be assayed for analysis and DNA damage that can be passed on to off-spring

3.1.17

'green' procurement

selection of products and services that minimizes the impact of the products and services on the environment

3.1.18

ground water

water that occupies pores in the soil and cavities and spaces found in the rocks which are situated in the saturated zone of the profile by rising from a deep magmatic source or by the infiltration of rainfall

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3.1.19

handling

functions associated with the movement of healthcare waste, including storage, treatment and ultimate disposal, by the use of manual systems and automated systems

3.1.20

hazard

intrinsic potential property or ability of any agent, equipment, material, or process to cause harm

NOTE Harm is an injury or damage to the health of humans or to the environment (or both).

3.1.21

healthcare facility

place or site where professional health services are dispensed to human or animal patients or where biological research is carried out, e.g. laboratories, and includes, *inter alia*, hospitals, clinics, laboratories, rehabilitation centres, sick bays, old age homes, free-standing operating theatres, day units, mobile and stationary clinics, and field stations where biomedical samples are taken

3.1.22

incineration

controlled burning of solid, liquid, or gaseous combustible wastes to produce gases and residues that contain little or no combustible material

3.1.23

micro-organism

any microbiological entity, cellular or non-cellular, capable of replication or of transferring genetic material

3.1.24

monitoring

continuous or non-continuous measurement of a concentration or other parameters for purposes of assessment or control of environmental quality or exposure and the interpretation of such measurements

3.1.25

radiotherapy

use of ionizing radiation to treat disease

3.1.26

recycling

extraction and recovery of material from scrap or other discarded material that can be reprocessed to manufacture a new product

3.1.27

residue

material, such as ash or slag, that remains after combustion or treatment of wastes, or materials extracted from a liquid or gas stream

3.1.28

risk

probability that a hazard will cause harm, and the severity of that harm

3.1.29

segregation

systematic separation of healthcare waste into designated categories

3.1.30

sewage

community's liquid waste, that is carried off in sewers and comprises a combination of the liquid or water-carried wastes from domestic, municipal, and industrial premises

3.1.31

sewer

system for the collection and transportation of sewage, including conduits, pipes, and pumping stations

3.1.32

sharps

items such as needles, syringes, blades or clinical glass, that are capable of causing cuts, abrasions or puncture wounds

3.1.33

sterilization

reduction of more than 99,9999 % or 6 log₁₀ of the micro-organisms present by means of physical, chemical, or mechanical methods, or by irradiation

3.1.34

storage

placement of waste in a suitable location or facility where isolation, environmental and health protection, and human control (e.g. monitoring for radioactivity and limitation of access) are provided with the intention that the waste will be subsequently retrieved for treatment or disposal (or both) (or clearance of radioactive waste)

3.1.35

treatment

any method, technique or process for altering the biological, chemical, or physical characteristics of the waste in order to reduce the hazards it presents and to facilitate its disposal by volume reduction, disinfection, neutralization, or other change of form

3.1.36

waste

undesirable or superfluous by-product, emission, residue or remainder of any process or activity, any matter, gaseous, liquid or solid or any combination thereof, which

- a) is discarded by any person;
- b) is accumulated and stored by any person with the purpose of eventually discarding it with or without prior treatment connected with the discarding thereof; or
- c) is stored by any person with the purpose of recycling, reusing or extracting a usable product from such matter

3.1.36.1

anatomical waste

pathological waste

waste that contains tissues, organs, body parts, blood and body fluids from patients, fetuses and animal carcasses, but excludes teeth and hair

NOTE 1 Anatomical waste is considered as a subcategory of infectious waste even though it can also include healthy body parts.

NOTE 2 Blood and body fluids from healthy individuals do not fall under this category.

NOTE 3 Animal carcasses generated by the public are not covered by this definition.

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3.1.36.2

chemical waste

solid, liquid and gaseous products that are to be discarded and that contain dangerous or polluting chemicals that pose a threat to humans, animals or the environment, when improperly disposed of

3.1.36.3

cytotoxic waste

waste that is toxic to cells and that can lead to cell death

3.1.36.4

genotoxic waste

waste capable of interacting with living cells and causing genetic damage

3.1.36.5

hazardous waste

waste that can, by circumstances of use, quantity, concentration or inherent physical, chemical or toxicological characteristics, have a significant adverse affect on public health and the environment when improperly treated, stored, transported or disposed of

3.1.36.6

healthcare general waste

the portion of waste that poses a minimum degree of risk to human health and the environment, i.e. from administrative and housekeeping activities, e.g. paper, pens, flowers, food packaging, plastics cooldrink bottles, old mops, builders' rubble and garden waste

3.1.36.7

healthcare risk waste

human and animal anatomical waste, infectious human and animal waste, sharps, chemical waste, pharmaceutical waste and radioactive waste generated by healthcare professionals, healthcare facilities and other non-healthcare professionals, e.g. tattooists and taxidermists

NOTE Healthcare risk waste is a subcategory of hazardous waste.

3.1.36.8

infectious non-anatomical waste

waste that contains or is suspected to contain pathogens, bacteria, viruses, parasites or fungi in sufficient concentrations or quantities to cause disease in susceptible hosts

3.1.36.9

pharmaceutical waste

unused medicines, medications and residues of medicines that are no longer usable as medication

3.1.36.10

radioactive waste

liquid, solid or gaseous materials that contain, or are contaminated with, radionuclides at concentrations or activities greater than the clearance levels and for which no use is foreseen

3.1.37

waste generator

any person, organization or facility engaged in activities that generate waste

3.1.38

waste management

all activities, administrative and operational, involved in the handling, treatment, conditioning, storage, and disposal of waste (including transportation)

3.1.39

waste package

product which includes the waste form, waste container(s), and any internal barriers (e.g. absorbing materials or liners), prepared in accordance with the requirements for handling, transportation, storage, and disposal

3.2 Abbreviations

3.2.1 DEHP Di(2-ethylhexyl)phthalate

3.2.2 EVA ethyl vinyl acetate

3.2.3 HR Hazard Rating

3.2.4 IV intravenous

3.2.5 NCS Natural Colour System ®

3.2.6 PVC poly(vinyl chloride)

3.2.7 Sv sievert (1 Sv = 1 J/kg)

4 Requirements

4.1 Management requirements

4.1.1 The chief executive officer (see 3.1.6) shall retain overall responsibility for the management of healthcare risk waste in accordance with the relevant requirements and regulations of the current relevant national legislation (see annex A), or any other regulatory requirements of the relevant provincial and local governments.

4.1.2 The CEO of a healthcare facility

- a) may assign responsibilities for the management of healthcare risk waste,
- b) shall adopt a documented waste management policy,
- c) shall approve the implementation plan developed by the waste management team (see 4.2),
- d) shall monitor and review the implementation of the waste management plan,
- e) shall provide sufficient resources for onsite storage facilities, if necessary, and the operation of the facilities in accordance with the current relevant national legislation (see annex A),
- f) shall be responsible for the compliance of on-site treatment facilities with the current relevant national legislation (see annex A), and
- g) shall provide an environmental management policy, where applicable, in accordance with the current relevant national legislation (see annex A).

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4.2 Requirements for the waste management team

4.2.1 General

4.2.1.1 The waste management team shall be assigned in accordance with 4.1.2(a) and, depending on the type of healthcare facility, may comprise of the following key members,

- a) a waste management officer;
- b) heads of departments;
- c) an infection control officer;
- d) a chief pharmacist;
- e) a radiation officer;
- f) a senior nursing manager;
- g) a health and safety manager;

NOTE A nominated health and safety representative can be represented on the waste management team. If a health and safety manager has been appointed to oversee two or more health and safety representatives at a healthcare facility, then the health and safety manager can be part of the waste management team.

- h) a maintenance engineer (where possible) or a maintenance manager;
- i) a financial manager;
- j) a procurement manager; and
- k) a waste management contractor when applicable and when required as an advisor in meetings.

NOTE 1 This is not a complete list of the waste management team. The waste management team can also include the cleaning contractor, regional managers or union representatives.

NOTE 2 An environmental health practitioner can monitor incidences that can result in injuries.

4.2.1.2 Members of the waste management team can also hold other positions at the healthcare facility and perform their waste management team responsibilities on an add-on basis.

4.2.1.3 The waste management team shall include the functions of all departments when developing the waste management plan as illustrated in the flow diagram in figure 1.

4.2.1.4 The person responsible for an area or department shall ensure that the healthcare risk waste is managed in that area.

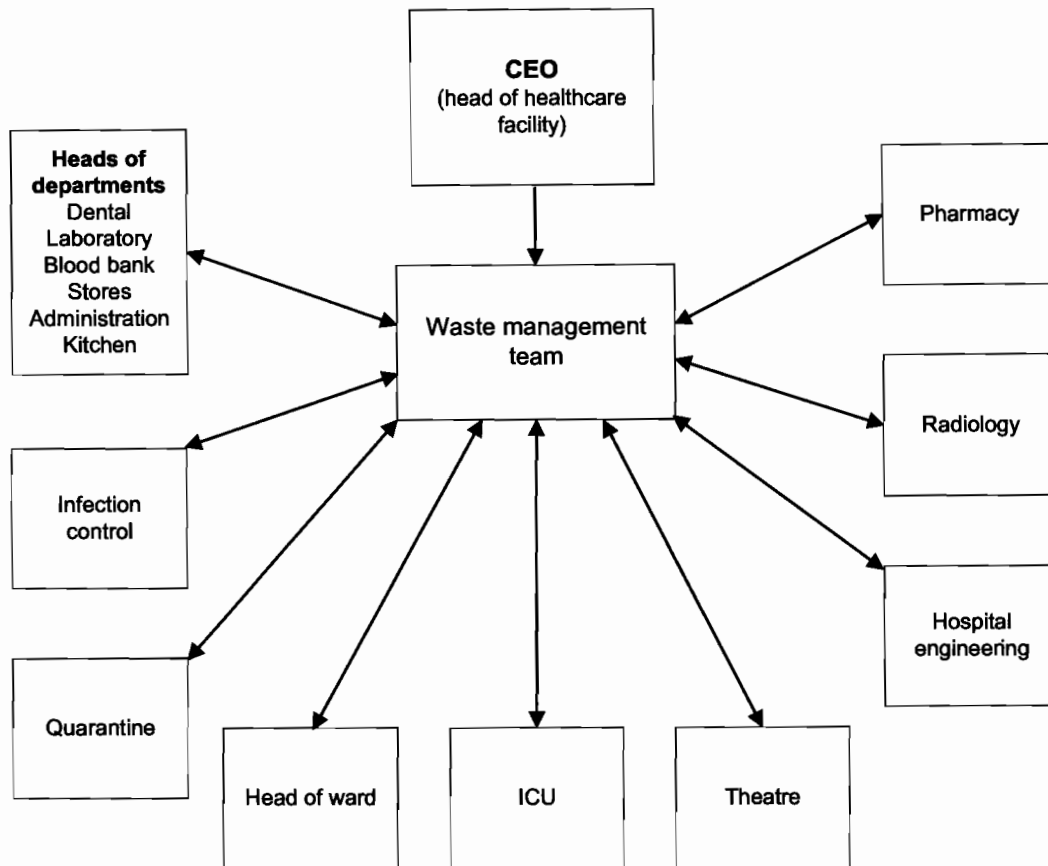


Figure 1 — Example of functions in a healthcare facility

4.2.2 Waste management officer

The waste management officer shall:

- a) be responsible for the development of a written waste management plan that defines the duties of all staff members in respect of handling healthcare risk waste;
- b) be responsible for the day to day operation, monitoring and implementation of the waste management plan;
- c) be responsible for the control of internal collection and transportation of waste;
- d) monitor and coordinate the staff assigned to containerize, collect, transport and store the healthcare risk waste within the healthcare facility;
- e) ensure that healthcare general waste (see 3.1.36.6) destined for recycling is stored in a separate area or storeroom;
- f) ensure that the waste storage points are managed acceptably to prevent unauthorized dumping;
- g) liaise with the other members of the waste management team to minimize any healthcare risk

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waste disposal anomalies and ensure compliance with the waste management plan;

- h) monitor the treatment and disposal of the healthcare risk waste on-site, where applicable;
- i) monitor the collection of the healthcare risk waste by the waste management contractor in accordance with the waste management contract (see annex B) and the waste management plan; and
- j) maintain records of all data produced from consignment notes and any other sources.

4.2.3 Heads of departments

The heads of departments shall manage the generation of healthcare risk waste in their departments, including waste avoidance, segregation, containerization, storage and treatment or disposal (or both). They shall also ensure that:

- a) the doctors, nurses, clinical and non-clinical professional personnel
 - 1) are trained in the segregation and storage procedures of waste, and
 - 2) comply with the waste management plan;
- b) key personnel are trained in the segregation, containerization, storage and internal transportation of healthcare risk waste;
- c) workers are adequately supervised with regard to all operations, including the safe handling of healthcare risk waste; and
- d) any non-compliance of procedures are noted and resolved with the assistance of the waste management officer.

4.2.4 Infection control officer

The infection control officer shall advise the waste management team on

- a) infection control,
- b) the handling of infectious waste,
- c) the health and safety policy, and
- d) the treatment and disposal of healthcare risk waste.

4.2.5 Chief pharmacist

The chief pharmacist shall:

- a) ensure the minimization of pharmaceutical waste;
- b) advise the waste management team on pharmaceutical waste treatment or disposal (or both);
- c) monitor and coordinate the pharmaceutical waste generation, treatment or disposal; and
- d) train staff that are involved in pharmaceutical waste disposal.

4.2.6 Radiation officer

The radiation officer shall:

- a) be appointed by the CEO in accordance with the relevant requirements and regulations of the current relevant national legislation (see annex A);
- b) be responsible for the minimization of radioactive waste by storing short half-life radioactive waste until decayed to a surface dose rate not exceeding 5 $\mu\text{Sv/h}$;
- c) advise the waste management team on the segregation and disposal of radioactive waste;
- d) coordinate the monitoring of radioactive waste production and treatment or disposal; and
- e) be responsible for the training of staff involved in radioactive waste treatment or disposal (or both).

4.2.7 Senior nursing manager

The senior nursing manager shall ensure that nursing staff, assistants, attendants and ancillary staff are trained in the correct procedures for segregation, containerization, storage and internal transportation of healthcare risk waste.

4.2.8 Health and safety manager

The health and safety manager shall:

- a) report any injuries to employees during activities related to the management of healthcare risk waste (see 5.8.3);
- b) investigate and record any complaints regarding health and safety in accordance with the requirements and regulations of the current relevant national legislation (see annex A);
- c) review the effectiveness of the health and safety measures;
- d) liaise with the waste management team to identify potential hazards; and
- e) maintain records of all incidents that contravene operating procedures.

4.2.9 Maintenance engineer or maintenance manager

The maintenance engineer or maintenance manager shall be responsible for

- a) the instalment and maintenance of waste storage facilities, equipment used in the handling of the waste, and on-site waste treatment or disposal facilities,
- b) the training of staff in the operation and maintenance of such facilities and equipment, and
- c) keeping records of the maintenance of the facilities and equipment, and for training of the relevant staff members.

4.2.10 Financial manager

The financial manager shall ensure that there is a budget for the management of healthcare risk waste.

5 The waste management plan

5.1 General

5.1.1 The waste management team shall make an assessment of all the healthcare risk waste generated in the healthcare facility before the development of a waste management plan. The assessment shall include estimates of any future changes in the growth, or designation, of the

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healthcare facility or its departments. Data from the survey shall form the basis on which the waste management plan shall be developed.

NOTE It is recommended that the waste management team consider the options and procedures given in the *Self-assessment manual for proper management of medical wastes* (see bibliography) when starting on the development of a waste management plan.

5.1.2 The waste management team shall establish and maintain a documented waste management plan in accordance with the relevant requirements and regulations of the current relevant national legislation (see annex A). The waste management plan shall include documents for all the processes in the healthcare facility (see 5.2.1).

5.1.3 An implementation plan shall form part of the waste management plan.

5.1.4 The waste management team shall ensure that there are written contingency procedures in the event of failure of any aspect of the waste management plan and that trained personnel are aware of the action to be taken.

5.1.5 The waste management team shall be responsible for the constant review and update of the waste management plan to assess opportunities for improvements and to ensure compliance with regulations.

5.2 Documentation requirements

5.2.1 Documents

The documents to be used in the healthcare facility shall include:

- a) work instructions and work procedures that are documented, implemented and maintained;
- b) work instructions and work procedures for training that are developed in a comprehensible format;
- c) quality control procedures;
- d) a document for *pro forma* service level agreements between the different departments;
- e) applicable documents that are available at the point of use;
- f) operating manuals for all equipment;
- g) safety instructions and precautions for the handling and storage of all healthcare risk waste;
- h) an emergency response policy and strategy to deal with spills of infectious and chemical wastes (see 10.1);
- i) non-compliant procedures and the appropriate corrective actions to be taken;
- j) a document on the conduct and behaviour of staff and non-staff members (see 5.6.3);
- k) a document that describes the retention of documents as proof of the proper treatment, destruction and disposal of the healthcare risk waste by the waste management contractor; and
- l) a document that describes record keeping for waste management.

5.2.2 Document control

The waste management team shall establish a procedure for the control of **all** documents related to the approved waste management plan. The controls shall include the following:

- a) that all documents are first reviewed and approved for adequacy before being issued;
- b) the establishment of a suitable identification system for all documents;
- c) the review, update (when necessary) and re-approval of documents every three years;
- d) the establishment of a master list of all controlled documents that indicates the location of the documents and their revision status;
- e) that obsolete documents be withdrawn and replaced with current versions;
- f) that records be controlled in accordance with the policy of the healthcare facility; and
- g) the retention of all documentation and certificates in terms of the relevant requirements and regulations of the current relevant national legislation (see annex A) and the relevant regulatory requirements related to labour issues.

NOTE See annex C for examples of documents.

5.3 Contractual commitments

5.3.1 Contracts for the treatment and disposal of the healthcare risk waste (see annex B) shall be entered into **only** when the waste management contractor discloses a license or permit authorized by the relevant authority for the treatment or disposal (or both) of each category of healthcare risk waste in accordance with the relevant requirements and regulations of the current relevant national legislation (see annex A).

5.3.2 The healthcare facility shall be responsible for the healthcare risk waste from generation to its final disposal in accordance with the relevant requirements and regulations of the current relevant national legislation (see annex A), even when a contract has been agreed to with a waste management contractor for the treatment and disposal of this waste.

5.3.3 The healthcare facility shall maintain documented evidence of monitoring the waste management contractor (see 5.2.1(k)), e.g. that destruction documents are completed and correctly signed-off (see also 9.1.2, 9.3.1.8 and 11.6.2).

5.3.4 The requirements to be included in the contractual agreement between the healthcare facility and the waste management contractor are given in annex B.

5.4 Work procedures and work instructions

5.4.1 The work procedures and work instructions for the management of healthcare risk waste shall be:

- a) in a format that is easy to read and that is comprehensible to operators; and
- b) posted at work places and at the point of use.

5.4.2 Work procedures and work instructions shall be established for at least the following:

- a) the identification of the healthcare risk waste category in accordance with 6.1 and table 1;

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- b) the segregation of the healthcare risk waste into an appropriate colour-coded container (see 6.3 and table 1);
- c) training in the work procedures and work instructions (see 5.7);
- d) cleaning and disinfection;
- e) the correct use of all facilities, equipment and personal protective equipment;
- f) the storage of the healthcare risk waste at the point of generation until its collection;
- g) the transportation of the containerized healthcare risk waste for storage (see clause 9);
- h) the transportation of the healthcare risk waste for on-site treatment;
- i) the on-site treatment of the healthcare risk waste;
- j) the classification and final disposal of the residue from the treated healthcare risk waste in accordance with the relevant requirements and regulations of the current relevant national legislation (see annex A);
- k) the control and monitoring of processes in each department to achieve the specified cleanliness and infection control;
- l) rules on leaving the work area, and for working hours and break times; and
- m) visual warnings and details on hazardous healthcare material, dangerous areas and technical facilities that can create hazards.

5.5 Inspection and quality control

Each department shall provide documentation that verifies

- a) the categories of healthcare risk waste generated (see table 1),
- b) the number and sizes of containers of each category of healthcare risk waste generated in a specific time period,
- c) the date of collection,
- d) the authorized collector and proposed final point of treatment or disposal (or both),
- e) any deviations from the standard procedure,
- f) any corrective actions taken, and
- g) a record of treatment and disposal by the waste management contractor.

NOTE The recording of treatment and disposal at departmental level can be required by the waste management plan.

5.6 Health and safety policy

5.6.1 The waste management plan shall include the health and safety policy, and shall be issued and communicated to all employees.

5.6.2 The health and safety policy shall include recommendations for a medical examination or check-up, and a policy on immunization for employees in contact with, or handling, healthcare risk waste.

NOTE 1 It is recommended that employees be offered counselling and appropriate immunization for certain

diseases, e.g. hepatitis B and tetanus. Counselling and treatment should also be offered to employees after occupational exposure to HIV and AIDS.

NOTE 2 It is recommended that employees who decline immunization, or who do not seroconvert, be advised in writing about the occupational risk associated with the work environment.

5.6.3 The health and safety policy shall be supplemented and supported by house rules which shall govern the conduct of personnel at the healthcare facility, non-company personnel, and the personnel of the waste management contractors (see annex B).

5.6.4 The health and safety policy shall be aimed at the safety and well-being of all employees, visitors and the public. The policy shall also ensure that all risks are considered and that the appropriate action is taken by the waste management officer to prevent the infection and contamination of the environment with healthcare risk waste.

5.6.5 The health and safety policy shall comply with all the relevant requirements and regulations of the current relevant national legislation that relate to air pollution, water pollution, soil pollution, occupational health and safety, and public health (see annex A).

5.7 Training

5.7.1 Training shall be provided to all employees at the beginning of employment, all contract workers that might be exposed to healthcare risk waste, and when new tasks or equipment are introduced. The training shall cover at least the following:

- a) the nature of the work;
- b) the chain of command, including the name(s) of the person(s) responsible for the work area(s);
- c) the safe handling of hazardous waste;
- d) the contents of the Material Safety Data Sheets (MSDSs);
- e) the meaning of the specific hazard risk warnings (R-phrases) and safety advices (S-phrases) likely to be found on the MSDSs;

NOTE SANS 10265 can be consulted regarding the format of an MSDS and the meanings of the R-phrases and S-phrases.
- f) the use of protective clothing;
- g) disposal procedures; and
- h) information on the health hazards associated with the work.

5.7.2 The training shall be repeated, refreshed or updated at least once a year.

5.7.3 A sufficient number of employees shall receive training to cover for leave periods, absences due to illness, and public holidays.

5.7.4 An attendance register should be kept and signed by each employee at each training session.

5.8 Workplace hygiene

5.8.1 Employees shall not eat, drink or smoke in areas where healthcare risk waste is handled and stored. "No smoking" signs shall be displayed and obeyed at all times.

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5.8.2 Separate areas shall be designated or provided for eating, drinking and smoking, in accordance with the relevant requirements and regulations of the current relevant national legislation (see annex A).

5.8.3 All injuries, including minor traumas, shall receive immediate medical attention and shall be reported to the health and safety representative in accordance with the relevant requirements and regulations of the current relevant national legislation (see annex A). Records of all reports shall be kept.

5.8.4 A regular supply of clean overalls, protective clothing, gloves and footwear, or other appropriate safety equipment that is specific for the work activities, shall be provided.

5.8.5 Work clothing shall be washed between uses by a laundry facility equipped to process clothing from healthcare facilities.

5.8.6 Employees that are in contact with or handle all hazardous healthcare risk waste shall also be provided with suitable gloves, aprons and, where necessary, face masks or breathing apparatus.

5.8.7 Employees working with hazardous healthcare risk waste shall not enter clinical areas or recreation or eating facilities without the removal of protective clothing.

5.8.8 When leaving "clean" areas, employees shall wash and don clean overalls or protective clothing upon returning to the "clean" areas.

5.8.9 Employees at managerial level, and visitors, shall wear the appropriate protective clothing when entering areas allocated for the handling of hazardous healthcare risk waste.

5.8.10 Personal protective equipment and facilities shall be kept clean and in good condition.

5.8.11 Hand-wash basins and, where applicable, showers with hot and cold water and soap or shampoo shall be provided.

5.8.12 The lockers provided to store personal clothing and personal items shall be situated away from work areas. The lockers shall not be used to store work clothing and personal protective equipment.

5.8.13 An emergency shower or eye-wash facility shall be provided in the washroom area and where chemicals are stored or handled.

6 Identification, classification, segregation, collection and minimization of healthcare waste

6.1 Identification

6.1.1 The management of healthcare risk waste shall start with the correct identification of the waste, followed by classification, segregation, collection and minimization. The generators of waste shall be responsible for the identification and segregation of the waste.

6.1.2 Healthcare waste is grouped into healthcare risk waste and healthcare general waste and categorized as follows:

- a) **healthcare risk waste categories:** infectious waste, anatomical (pathological) waste, sharps, chemical and pharmaceutical waste, heavy metals, pressurized containers and radioactive waste; and

b) **healthcare general waste categories:** packaging material, kitchen waste (domestic waste), office waste and building demolition waste, waste from patients (e.g. fruit juice bottles and magazines), non-clinical glass, non-infectious non-anatomical waste (e.g. paper tissues), disposable curtains, extracted teeth, nail clippings, hair and decontaminated waste, and garden and park waste.

6.1.3 For traceability and treatment purposes the waste shall be identified in accordance with 6.1.2 and shall be correctly labelled.

6.2 Classification (see annex D)

All healthcare risk waste shall be classified in accordance with SANS 10228, as expanded on in the relevant requirements and regulations of the current relevant national legislation (see annex A). The healthcare risk waste shall also be classified in accordance with the hazard and risk involved.

6.3 Waste segregation

6.3.1 The waste shall be segregated at the point of generation and shall be containerized to minimize the risk of contamination or pollution to the environment and humans.

6.3.2 Employees shall be trained in the correct identification and segregation of the waste (see flow diagram in figure 2).

6.4 Collection

The healthcare risk waste shall be collected at the point of generation (where applicable) and shall be the first step in the removal of the waste to its final disposal point.

6.5 Waste minimization

Careful pre-planning can minimize the amount of healthcare risk waste generated by a healthcare facility. Effective procurement and stock management, recycling where possible, and resource recovery should be considered as part of the management of waste.

NOTE See annex E for information on 'green' procurement.

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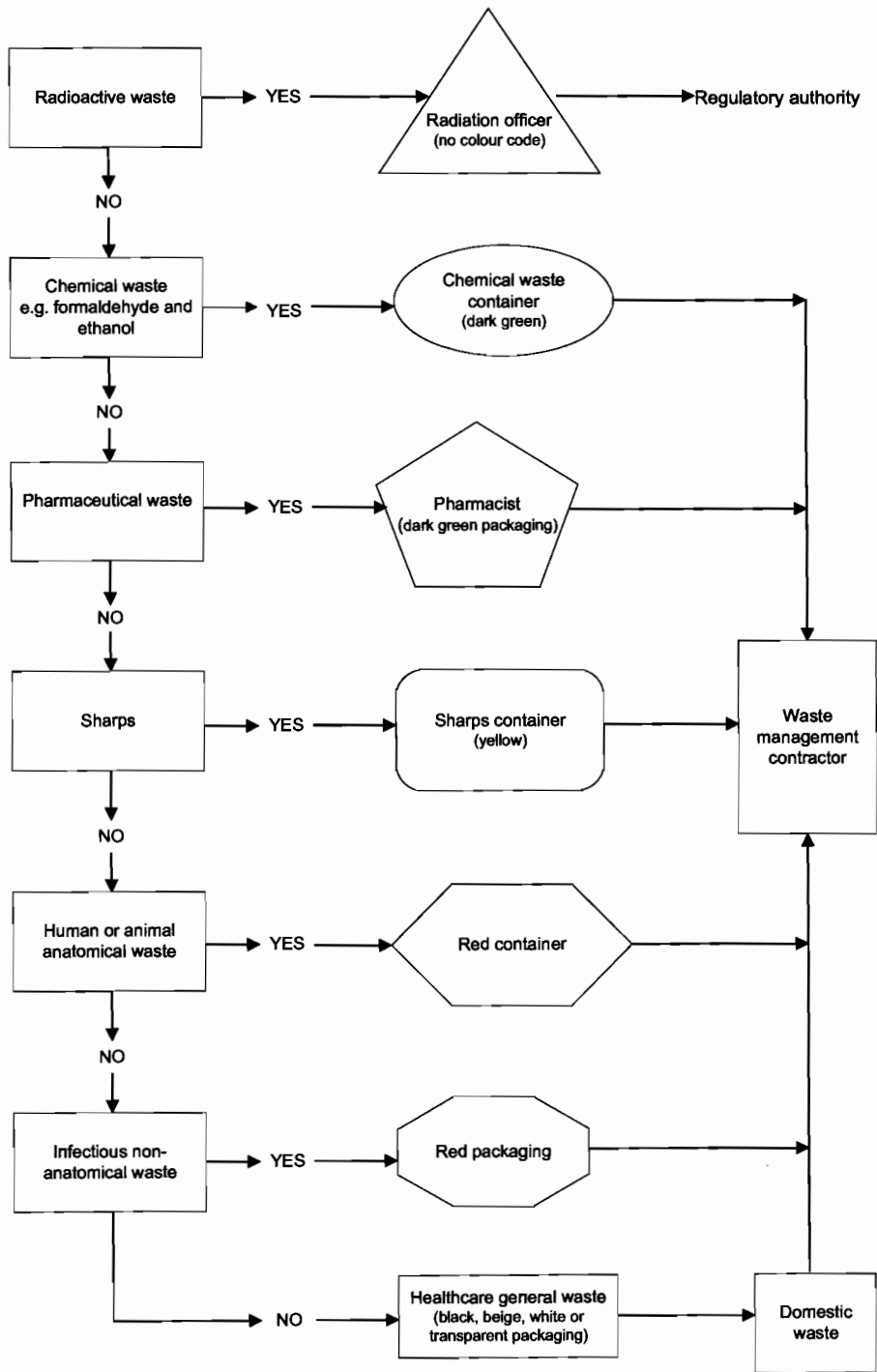


Figure 2 — Healthcare risk waste flow diagram

7 Packaging

7.1 Packaging requirements for healthcare general waste

7.1.1 Solid healthcare general waste shall be placed in a colour-coded waste container in accordance with table 1.

7.1.2 A plastics bag used for the containment of healthcare general waste shall not tear easily during handling and transportation.

7.1.3 The waste containers shall be filled in accordance with the relevant requirements and regulations of the current relevant national legislation (see annex A) and shall be securely closed to prevent spillage of the contents and access by scavengers or vermin.

NOTE Arrangements can be made with a waste removal service for high-density materials such as small amounts of building rubble and garden refuse, e.g. by the provision of on-site collecting bins.

7.2 Packaging requirements for healthcare risk waste

7.2.1 Plastics bags used as stand-alone containers shall have a thickness of 80 μm or more.

7.2.2 Plastics bags used as liners which form an integral part of a rigid container shall have a thickness of 60 μm or more.

7.2.3 When transported, all healthcare risk waste shall be packed and labelled in accordance with SANS 10229-1.

7.2.4 The lettering on the label shall be of a size, style and layout that is clearly legible. The colour of the surface area immediately surrounding the label shall contrast with the background of the label.

7.3 Colour coding of packaging

7.3.1 The packaging for healthcare risk waste shall be clearly marked with the appropriate colour code and the appropriate international hazard label(s) illustrated in annex F.

7.3.2 Table 1 gives the internationally accepted categories, sub-categories, colour coding, and labelling protocol for healthcare waste.

NOTE A colour coding system is used for ease of identification for the different categories.

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Table 1 — Healthcare waste categories, colour coding and international hazard label

1	2	3
Waste	Waste sub-category	Colour coding and international hazard label ^a
^b Human or animal anatomical waste	Infectious human anatomical	RED and the appropriate international infectious hazard label
	Infectious animal anatomical	ORANGE and the appropriate international infectious hazard label
	Non-infectious animal anatomical	BLUE
^b Infectious non-anatomical waste	None	RED and the appropriate international infectious hazard label
Sharps	None	YELLOW , the words "DANGER CONTAMINATED SHARPS" and the appropriate international infectious hazard label
Chemical waste including pharmaceutical waste	Chemical or pharmaceutical	DARK GREEN and the appropriate international hazard label
	Cytotoxic pharmaceutical	DARK GREEN and the cytotoxic hazard label (see figure 3)
Radioactive waste	None	No colour coding – only the appropriate international radiation hazard label
General waste		No hazard label ^c
^a See annex F for international hazard labels. ^b Chemical or radioactive solutions that contain human or animal anatomical and infectious non-anatomical wastes are considered as chemical waste or radioactive waste, respectively. ^c Black, beige, white or transparent packaging can be used.		

7.4 Packaging for infectious waste (excluding sharps)

7.4.1 Packaging for infectious waste shall be made from an impermeable, leak-proof material and shall be compatible with the envisaged treatment of the waste.

7.4.2 Packaging for infectious waste shall be filled to three-quarters capacity of the container and shall be securely closed.

7.4.3 Plastics bags shall be closed by means of non-PVC plastics ties, non-PVC plastics sealing tags of the self-locking type, or heat sealers purpose-made for healthcare risk waste. Plastics bags shall **not** be closed by means of stapling.

7.4.4 All category A waste, as indicated in SANS 10228 (e.g. contaminated with viral haemorrhagic fevers), shall be handled in accordance with procedures of the healthcare facility. The waste shall be placed into a double-layered plastics bag colour-coded in accordance with table 1 and shall be sealed (see 7.4.3). The sealed bag shall then be placed into a rigid disposable container colour-coded and labelled in accordance with table 1.

7.5 Packaging for sharps

7.5.1 A sharps container shall be used for the collection of all sharps (see 3.1.32).

7.5.2 All sharps containers shall be:

- a) manufactured in accordance with SANS 452;
- b) rigid, puncture-proof, tamper-proof and clearly marked in accordance with 7.2.3, 7.2.4 and table 1; and
- c) constructed from a material and in a manner that safely retains the sharps and any residual liquids from syringes (e.g. high-density polypropylene).

7.5.3 The lid of a sharps container shall be such that when sealed it cannot be released without excessive force. In the case of reusable sharps containers, the lid shall only be opened by means of an automated process or a process that prevents the risk of needle-stick injuries and contamination to the employees at the waste disposal facility.

7.5.4 The sharps container available in each department shall be appropriate for the type of work (e.g. a large sharps container where trocars are used).

7.5.5 Consideration can be given to the installation of needle destructors (incinerators) particularly when sharps waste disposal facilities are not optimal. This option shall **only** be applicable on the availability of a safe disposal system for the residue after incineration, and provided that the needle incinerator shall be used and maintained efficiently.

7.6 Packaging for chemical waste

7.6.1 General

7.6.1.1 Chemical waste intended for transportation outside a healthcare facility shall be classified in accordance with SANS 10228 and shall be packaged in accordance with SANS 10229-1 or SANS 10233.

7.6.1.2 Chemical waste shall first be sorted into the different hazard classes (see annex D) and then divided into chemical, pharmaceutical or cytotoxic waste, as applicable. Hazardous chemical waste of different classes shall not be mixed.

7.6.1.3 The packaging shall be clearly colour-coded dark green (see table 1) and marked in accordance with 7.2.3 and 7.2.4.

7.6.1.4 Chemical waste may be placed in empty containers that originally contained the same type of chemical, provided that the original label is removed or clearly defaced.

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7.6.2 Packaging for waste aerosol dispensers and gas cylinders of class 2

7.6.2.1 Waste aerosol dispensers

Waste aerosol dispensers shall:

- a) be stored in black plastics bags and shall be clearly marked "**Waste aerosol dispensers**" to distinguish from general waste;
- b) be itemised separately in a plastics bag for disposal via landfill or for recovery at a specialized facility; and
- c) not be disposed of by incineration.

7.6.2.2 Gas cylinders

7.6.2.2.1 Empty gas cylinders shall not be disposed of as healthcare general waste or healthcare risk waste or in an alternative treatment facility, and shall not be incinerated.

7.6.2.2.2 Empty gas cylinders shall be returned to the supplier for reuse, where appropriate.

7.6.3 Packaging for waste flammable liquids of class 3

7.6.3.1 Chlorinated and non-chlorinated solvents shall be segregated and stored in separate waste containers.

7.6.3.2 A waste flammable liquid can be stored in a metal or a high-density plastics container, or drum, that can be sealed with a screw cap lid. An alternative that might be acceptable for audit purposes would be to store the waste solvents in empty containers from which they were supplied (see 7.6.1.4).

7.6.3.3 Each container or drum shall:

- a) be marked "CHLORINATED ORGANIC SOLVENT WASTE" or "ORGANIC SOLVENT WASTE";
- b) be colour-coded dark green in accordance with table 1;
- c) bear the appropriate international hazard label for flammable liquids of class 3 (see annex F); and
- d) have, where necessary, a bold warning "**HIGHLY FLAMMABLE**" or "**FLAMMABLE**" depicted.

7.6.4 Packaging for waste oxidizing substances and organic peroxides of class 5

7.6.4.1 Waste oxidizing substances (see division 5.1 in annex D) and organic peroxides (see division 5.2 in annex D) shall be kept apart and shall also be segregated from other wastes.

7.6.4.2 These types of waste (see 7.6.4.1) shall be stored in plastic-lined metal drums, or high-density plastics drums, and shall be fitted with tamper-proof sealable lids.

7.6.4.3 A container with division 5.1 waste shall be clearly marked "OXIDIZING CHEMICAL WASTE" and shall bear the appropriate international hazard label for oxidizers of division 5.1 (see annex F).

7.6.4.4 A container with division 5.2 waste shall be clearly marked "ORGANIC PEROXIDE WASTE" and shall bear the appropriate international hazard label for organic peroxides (see annex F).

7.6.5 Packaging for waste toxic substances of class 6, division 6.1

7.6.5.1 Waste toxic substances shall be segregated and each type of toxic waste shall be stored in a separate container.

7.6.5.2 The containers shall be made of metal or high-density plastic and shall be sealed with a screw cap lid or a tamper-proof lid.

7.6.5.3 Each container shall:

- a) be clearly marked to indicate the toxic chemical waste inside;
- b) be colour-coded dark green in accordance with table 1; and
- c) bear the appropriate international hazard label for toxic substances of division 6.1 (see annex F).

7.6.5.4 Empty containers in which extremely toxic chemicals are supplied shall not be stored for future use as waste storage containers.

7.6.6 Packaging for pharmaceutical waste

WARNING! SPECIAL PRECAUTIONS ARE TO BE TAKEN TO PREVENT THE THEFT AND ILLEGAL DISTRIBUTION OF PHARMACEUTICAL WASTE.

7.6.6.1 The containers for liquid pharmaceutical waste shall:

- a) be made of metal or high-density plastic and shall be sealed with a screw cap lid or a tamper-proof lid;
- b) be clearly marked "PHARMACEUTICAL WASTE – LIQUID";
- c) be colour-coded dark green in accordance with table 1; and
- d) bear the appropriate international hazard label for toxic substances of division 6.1 (see annex F).

7.6.6.2 When the liquid pharmaceutical waste has a subsidiary risk of "flammability", the appropriate international hazard label for flammable liquids of class 3 shall also be affixed to the waste container.

7.6.6.3 Solid pharmaceutical waste shall be stored in double layer plastics bags which shall:

- a) be colour-coded dark green in accordance with table 1;
- b) be clearly marked "PHARMACEUTICAL WASTE – SOLID"; and
- c) bear the appropriate international hazard label for toxic substances of division 6.1 (see annex F).

7.6.6.4 The plastics bags for solid pharmaceutical waste shall be securely sealed by means of non-PVC plastics ties, steel-wire, non-PVC plastics sealing tags of the self-locking type, or heat sealers purpose-made for healthcare risk waste.

7.6.7 Packaging for cytotoxic and genotoxic waste

7.6.7.1 Cytotoxic waste can be generated from several sources that include the following:

- a) contaminated material from drug preparation and administration (e.g. needles, gauges, vials and packaging);

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- b) expired drugs, excess solutions (leftover) and drugs returned from the wards; and
- c) urine, faeces and vomit from patients, which can contain hazardous amounts of the administered cytotoxic drugs, or their metabolites, which should be considered as genotoxic for at least 48 h and sometimes up to one week after drug administration.

7.6.7.2 The packaging for cytotoxic waste shall bear the hazard label as depicted in figure 3. The triangle shall be printed in red on a black background and the text shall be in white.

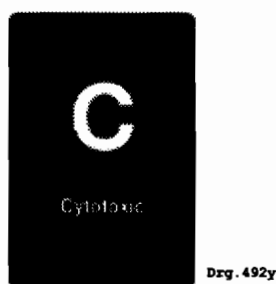


Figure 3 — Cytotoxic hazard label

7.6.7.3 Sharps contaminated with cytotoxic or genotoxic pharmaceuticals shall:

- a) be segregated and stored in a sharps container;
- b) be clearly marked "CYTOTOXIC SHARPS" or "GENOTOXIC SHARPS"; and
- c) bear the cytotoxic hazard label as depicted in figure 3.

7.6.7.4 Cytotoxic and genotoxic pharmaceutical waste and contaminated materials (e.g. tubing and infusion bags) shall:

- a) be stored in containers made of metal or high-density plastic and shall be sealed with a screw cap lid or a tamper-proof lid;
- b) be clearly marked "CYTOTOXIC WASTE" or "GENOTOXIC WASTE"; and
- c) bear the cytotoxic hazard label (see figure 3).

7.6.8 Packaging for radioactive waste of class 7

7.6.8.1 General

Waste generated in a radioactive controlled area of a healthcare facility shall be segregated at the point of origin into three categories; inactive waste, low-level waste and high-level waste.

7.6.8.2 Inactive waste

Inactive radioactive waste are laboratory utensils and material that are used inside a radioisotope laboratory or in the vicinity of radioactive materials, but have not come into contact with radioactive material. When tested, this type of waste has no background radiation that can be detected and has a low risk of contamination, and may be disposed of in the general waste in accordance with the relevant requirements and regulations of the current relevant national legislation (see annex A).

7.6.8.3 Low-level waste

7.6.8.3.1 Low-level radioactive waste has a surface dose rate of not more than 5 $\mu\text{Sv/h}$.

7.6.8.3.2 Low-level radioactive waste can be stored in a refuse bin with a lid and shall be lined with a strong plastics bag. The plastics bag shall be:

- a) filled to three-quarters of its capacity;
- b) securely sealed with a non-PVC adhesive tape, or it can be heat-sealed; and
- c) placed into another plastics bag, a box or another suitable container (e.g. a drum) and shall be securely sealed.

7.6.8.3.3 The outer container shall be clearly marked "RADIOACTIVE WASTE" and shall bear the appropriate international hazard label for ionizing radiation in accordance with table 1 and annex F.

7.6.8.3.4 Sharps that are contaminated with low-level radioactive waste shall be stored in a sharps container, which shall:

- a) be clearly marked in accordance with table 1; and
- b) bear the appropriate international hazard label for ionizing radiation (see annex F).

7.6.8.4 High-level waste

7.6.8.4.1 High-level radioactive waste has a surface dose rate of more than 5 $\mu\text{Sv/h}$.

7.6.8.4.2 High-level radioactive waste shall be stored in specifically designed lead-lined waste containers to decay to a surface dose rate below 5 $\mu\text{Sv/h}$ as per the relevant requirements and regulations of the current relevant national legislation (see annex A).

7.6.8.4.3 High-level radioactive waste can be disposed of via the relevant national department or regulatory body in accordance with the relevant requirements and regulations of the current relevant national legislation (see annex A).

7.6.9 Packaging for corrosive waste of class 8

7.6.9.1 Acids

Acid waste that has a pH value lower than 2 shall be:

- a) segregated from other waste; and
- b) stored in appropriate glass or plastics containers that shall
 - 1) be sealed with a screw cap lid,
 - 2) be clearly marked "ACID WASTE",
 - 3) be colour-coded dark green in accordance with table 1, and
 - 4) bear the appropriate international hazard label for corrosives (see table 1 and annex F).

7.6.9.2 Alkalis (bases)

Alkaline waste that has a pH value greater than 12 shall be:

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- a) segregated from other wastes; and
- b) stored in appropriate plastics containers that shall
 - 1) be sealed with a screw cap lid,
 - 2) be clearly marked "ALKALI WASTE",
 - 3) be colour-coded dark green in accordance with table 1, and
 - 4) bear the appropriate international hazard label for corrosives (see table 1 and annex F).

8 Waste storage

8.1 Temporary healthcare risk waste stores

8.1.1 The waste management plan shall clearly indicate the location of each temporary healthcare risk waste store, the collection points and the categories of healthcare risk waste generated at each department.

8.1.2 The temporary store shall be situated in an area that minimizes the risk of contamination to the main operations of that area, medicines, foodstuffs, textiles, employees, patients and visitors.

8.1.3 The waste management plan shall indicate the times and routes for the collection of healthcare risk waste from each temporary waste store.

8.2 Central healthcare risk waste stores

8.2.1 The healthcare risk waste stores shall be clearly demarcated as such.

NOTE Some healthcare facilities can have more than one healthcare risk waste store.

8.2.2 Separate storage areas shall be indicated to accommodate the different categories of healthcare risk waste in the store.

8.2.3 The healthcare risk waste store shall:

- a) be sheltered from direct sunlight;
- b) allow good (passive) ventilation;
- c) be well lit;
- d) be equipped with water to facilitate cleaning; and
- e) be verminproof.

8.2.4 The healthcare risk waste store shall be locked, access controlled (see 8.2.5) and inaccessible to unauthorized personnel and birds.

8.2.5 Personnel handling the healthcare risk waste and the vehicles used for delivering and collecting waste shall be allowed easy access to the healthcare risk waste store.

8.2.6 It is recommended that refrigeration be installed in the healthcare risk waste store for waste that requires storage at a low temperature and for waste stored for a period indicated in column 2 of

table 2.

8.2.7 The storage times for healthcare risk waste, i.e. the delay between generation and treatment or disposal, shall not exceed the time limits indicated in table 2, unless otherwise specified. All containers shall be sealed.

Table 2 — Time limits for the storage of healthcare risk waste

1	2
Waste	Time limits
Pathological waste ^a	24 h
Infectious waste ^a	72 h
Sharps containers	90 d
Pharmaceutical waste	90 d
^a The waste may be stored at -2 °C for 90 d.	

8.2.8 The healthcare risk waste store shall have sufficient capacity to accommodate the volume of waste to be stored in accordance with the relevant requirements and regulations of the current relevant national legislation (see annex A).

8.2.9 The healthcare risk waste store shall be equipped with the necessary protective clothing and emergency equipment to deal with spillage or fire, e.g. fire extinguishers.

8.2.10 Only healthcare risk waste packaged and labelled in accordance with 6.1, 7.2 and table 1 shall be accepted in the central healthcare risk waste store.

8.2.11 The responsible officer at the central healthcare risk waste store shall keep a record of the hazardous waste which shows at least the following:

- a) waste generator;
- b) location of waste;
- c) quantity;
- d) composition and description;
- e) classification (see annex D for hazard classes);
- f) recommended mode of treatment or disposal (or both);
- g) date of collection from the department or unit; and
- h) written acknowledgement of collection by the responsible officer at the waste source and receipt at the central waste store by the responsible officer.

8.2.12 The floor of the central healthcare risk waste store shall be:

- a) impermeable;

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- b) slip-resistant;
- c) hard-standing to facilitate easy cleaning; and
- d) equipped with good drainage that forms part of a water management system and connects to a sewer.

8.3 Provisions for the storage of infectious waste and non-infectious anatomical waste

8.3.1 An infectious waste store shall be clearly marked "INFECTIOUS WASTE" and shall display the appropriate international infectious hazard label (see annex F).

8.3.2 The infectious waste store shall be the repository for the following healthcare risk waste categories:

- a) infectious human and animal anatomical waste;
- b) infectious non-anatomical waste;
- c) non-infectious anatomical waste;
- d) blood; and
- e) sharps.

8.3.3 Non-infectious anatomical waste and infectious waste shall be stored in containers that comply with the requirements given in 7.2 and 7.4.

8.3.4 The infectious waste store shall be locked, access controlled and inaccessible to unauthorized persons.

8.4 Provisions for the storage of chemical and pharmaceutical waste

8.4.1 A chemical waste store shall be clearly marked "CHEMICAL WASTE" and shall display the appropriate international hazard labels (see annex F) to indicate the classes of the stored chemicals.

NOTE Non-hazardous chemical waste consists of chemicals that are not described in 8.4.4 to 8.4.7, and includes sugars, amino acids and certain organic and inorganic salts.

8.4.2 All chemical healthcare risk waste shall be stored in containers that comply with the requirements in 7.6.

8.4.3 The chemical waste store shall be locked, access controlled and inaccessible to unauthorized persons.

8.4.4 Cytotoxic pharmaceutical waste shall be stored in a separate and locked section of the chemical waste store, and shall be clearly marked "CYTOTOXIC WASTE" (see 7.6.7.4 and figure 3).

8.4.5 Toxic chemical waste shall:

- a) be stored in a separate section of the chemical waste store;
- b) be clearly marked "TOXIC WASTE"; and

c) display the appropriate international hazard label (see annex F).

8.4.6 The chemical waste store shall include a separate bunded section for liquid chemical waste. The bunded section shall be 1,5 times the capacity of the volume of chemicals stored to facilitate spillages, and shall be separated into different areas to accommodate the different classes of liquid chemical waste.

8.4.7 Acids and alkalis stored in the bunded section shall be clearly marked with the appropriate international hazard labels (see annex F).

NOTE It is recommended that acids and alkalis be segregated in the storage area.

8.4.8 Solvent waste stored in the bunded section shall be clearly marked with the appropriate international hazard label (see annex F).

NOTE It is recommended that flammable liquid waste be stored in a separate solvent store fitted with heat activated fire extinguishers appropriate for the types of fire that could develop and the types of chemicals stored.

8.4.9 Reactive chemicals that are highly oxidizing, reactive with water, explosive, or shock sensitive, shall be stored in an area clearly marked with the appropriate international hazard labels (see annex F).

8.4.10 Material Safety Data Sheets (MSDSs) of the chemicals shall be kept in the chemical waste store and shall be made available to the personnel handling the waste (see 5.7.1 (d) and (e)).

8.5 Provisions for the storage of radioactive waste

The radioactive waste store shall be:

- a) clearly marked "RADIOACTIVE WASTE" and shall display the appropriate international hazard label (see annex F). The contact number of the radiation officer shall be indicated on the hazard label for emergency purposes;
- b) constructed from flameproof material and the floor surface, benches and walls shall facilitate radioactive decontamination;
- c) fitted with an extraction system and the air shall be monitored;
- d) equipped with sufficient shielding material in the walls, or as movable shielding material, to prevent the exposure to radiation outside the storage area; and
- e) locked at all times to prohibit unauthorized access.

8.6 Provisions for the storage of healthcare general waste

8.6.1 The storage area for healthcare general waste shall comply with the requirements given in 8.2.

8.6.2 The location of the storage area shall be in a section of the healthcare facility that facilitates the loading of waste into the collection vehicles without constraints to the traffic flow at the healthcare facility.

9 Collection and transportation of healthcare risk waste

9.1 Collection of healthcare risk waste within a healthcare facility

9.1.1 The waste management plan shall include a detailed schedule for the collection of the waste

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generated at the source. The schedule shall include the following information:

- a) a list that identifies the waste source;
- b) a plan that indicates the location of the waste source and the central waste store(s);
- c) the name of the responsible officer for each shift at each waste source;
- d) the name of the responsible officer for each shift at the central waste store(s);
- e) a list that outlines the categories of waste likely to be generated at each waste source;
- f) the appropriate route to be taken by the person(s) collecting waste for delivery to the central waste store(s); and
- g) a timed collection schedule to prevent the mixing of the waste that could result in the collection, transportation and storage of incompatible waste or the contamination of one category of waste by another.

9.1.2 The waste management officer shall monitor the waste collection system and shall ensure the execution of the system in accordance with the waste management plan (see clause 5), and that all data produced from consignment notes and any other sources are appropriately recorded.

9.2 Transportation of healthcare risk waste within a healthcare facility

9.2.1 Healthcare risk waste may be transported by trolleys, wheeled containers or carts that are not used for any other purpose within the healthcare facility. The equipment used for transportation shall be:

- a) easy to load and unload;
- b) free of sharp edges that could damage waste bags during loading and unloading; and
- c) easy to clean and disinfect in accordance with 5.4.2 (d).

9.2.2 Records of cleaning and disinfection processes shall be kept.

9.2.3 The trolleys, wheeled containers or carts shall be properly maintained and replaced when necessary.

9.2.4 The seals on the waste bags shall be intact at the end of transportation.

9.2.5 Sufficient equipment shall be provided to ensure efficient execution of the waste management plan (see clause 5).

9.3 Collection of healthcare risk waste for off-site transportation

9.3.1 Collection of healthcare risk waste

9.3.1.1 The waste management plan shall include a schedule for the collection of the healthcare risk waste at the central waste store(s), and the treatment or disposal (or both) of healthcare risk waste by a waste management contractor when applicable (see annex B).

9.3.1.2 Category A waste, as indicated in SANS 10228, shall be transported separately. The waste management contractor shall be informed when category A waste is to be collected for special precautions during handling.

9.3.1.3 The manual collection of the waste shall be in accordance with the relevant requirements

and regulations of the current relevant national legislation (see annex A).

9.3.1.4 The waste management contractor shall be suitably equipped for the proposed activities.

9.3.1.5 The waste management contractor shall provide documented evidence of compliance with the requirements and regulations of the current relevant national legislation (see annex A) regarding the disposal facility of a subcontractor for the treatment or disposal (or both) of healthcare risk waste.

9.3.1.6 A system for consignment notes shall be in place to provide data for records of the treatment or disposal (or both) activities of healthcare risk waste.

9.3.1.7 An emergency back-up plan shall be in place that will provide a low risk to the public and the environment if, or when, the off-site waste collection and the treatment system or the disposal system fails.

9.3.1.8 The following data shall be recorded for off-site collection of healthcare risk waste:

- a) the signatures of the responsible officer at the central waste store and the representative of the waste management company;
- b) the time and date; and
- c) the amount of waste collected for the different categories.

9.3.1.9 The waste management company shall provide documented evidence to the waste management officer of the final treatment or disposal (or both) of the healthcare risk waste.

9.3.2 Off-site transportation of healthcare risk waste

9.3.2.1 A vehicle used for the off-site transportation of hazardous healthcare risk waste shall comply with the requirements in SANS 1518, SANS 10231, SANS 10232-1, SANS 10232-3, and the relevant requirements and regulations of the current relevant national legislation (see annex A).

9.3.2.2 The waste management contractor or the transporter of healthcare risk waste shall be registered in accordance with the relevant requirements and regulations of the current relevant national legislation (see annex A).

10 Spillage of healthcare risk waste during transportation

10.1 Policy and strategies

10.1.1 The waste management plan shall include a documented policy and the appropriate strategies to implement for the effective management of spills.

10.1.2 The strategy for the management of spills shall include the following:

- a) a means to notify the person(s) designated to supervise and execute the clean-up;
- b) a method for the isolation and cleaning-up of each type of spillage, for the recovery of spills from the damaged vehicle, and for the traffic control that can be required at the spill site;
- c) information on the type and the location of the appropriate personal protective equipment for the personnel designated to perform the clean-up;

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- d) procedures for the protection of the public and other personnel that are not involved in the clean-up;
- e) procedures for the correct containment and disposal of the different waste categories spilled; and
- f) a means to notify the relevant authorities.

10.2 Clean-up procedures for infectious waste and hazardous chemical waste spills

Employees and clean-up personnel shall comply with the following clean-up procedures for the spillage of infectious and hazardous chemical waste.

- a) Evacuate and isolate the area to limit the spread of the spillage.
- b) Determine the nature of the spill and inform the emergency response team leader.
- c) Remove affected people from the area and provide first aid if necessary.
- d) Ensure that the clean-up personnel are supplied with the appropriate personal protective clothing and clean-up equipment.
- e) Collect the spilled material in a container appropriate for the waste category.
- f) Decontaminate the area in accordance with the procedure for the type of spillage.
- g) Rinse the area with clean water.
- h) Decontaminate or dispose of the personal protective clothing and the clean-up equipment in accordance with the waste management plan (see clause 5).
- i) Arrange a medical examination for all affected personnel, including preventative treatment where required.
- j) Complete the incident report form.

NOTE It is recommended that a "SPILL KIT" comprise at least the following:

- elbow-length gloves, closed shoes, full overalls, safety glasses, and respirators;
- absorbent material (e.g. vermiculite);
- disinfectant (e.g. a 2 % solution of glutaraldehyde);
- brooms, dustpans and shovels; and
- medical waste containers, heavy duty plastics bags and a selection of the appropriate "stick-on" hazard labels.

10.3 Clean-up procedures for cytotoxic pharmaceutical waste spills

Employees and clean-up personnel shall comply with the following clean-up procedures for the spillage of cytotoxic and pharmaceutical waste.

- a) Immediately evacuate people near the spillage or the release of the contaminant, particularly when the contaminant can easily disperse (e.g. gases, aerosols or volatile products).

- b) Inform the emergency response team leader, giving precise details of the nature of the spillage and then isolate, and when appropriate, mark off the area of the spill (using a marker or adhesive tape). Isolate areas contaminated by easily dispersed cytotoxic substances until decontamination of the areas by trained personnel can take place.
- c) Give immediate medical attention to people with an indication of acute intoxication.
- d) Arrange for the decontamination of people likely to have been contaminated.
- e) Remove any clothing likely to have been contaminated and store in appropriately labelled bags.

NOTE When drawing up plans to deal with cytotoxic spillages, the waste management team might wish to refer to the *Laboratory handling of mutagenic and carcinogenic products* (see bibliography).

11 Treatment and disposal methods

11.1 General

11.1.1 A healthcare facility shall comply with the provisions in this standard for the treatment and disposal of healthcare risk waste to demonstrate a "duty of care".

11.1.2 Before disposal, the untreated healthcare risk waste shall be classified in accordance with SANS 10228 and annex D to determine the hazard rating (see D.2) for the disposal of the waste to the appropriate landfill site. The residue from the treatment processes shall be classified in accordance with SANS 10228 and shall be tested in accordance with the relevant requirements and regulations of the current relevant national legislation (see annex A) to determine the hazard rating for disposal to a landfill site.

NOTE 1 The hazard rating indicates the class (type) of landfill site at which the healthcare risk waste can be disposed of.

NOTE 2 Hazardous waste landfill sites are divided into two types in accordance with the hazard rating of the waste; H:H landfills and H:h landfills. Healthcare general waste is disposed of at a general waste landfill site.

11.1.3 Untreated healthcare risk waste shall not be disposed of by landfill, and only sewage and wash water from storage areas shall be disposed of into the sewage system.

11.1.4 The methods of treatment and disposal shall be appropriate for the different categories of healthcare risk waste and the potential hazard thereof to humans and the environment.

11.1.5 The operators and maintenance staff of incineration, treatment and disposal facilities shall be given specialized training applicable to that specific technology.

11.2 Disposal via discharge to a municipal sewer

11.2.1 Most municipal sewage systems are designed and operated to accept liquid infectious waste. However, the healthcare facility shall not discharge healthcare risk waste to the sewage system.

11.2.2 In the case where there is a need to dispose of healthcare risk waste via a sewage system, the waste management team shall first investigate if the waste can be treated before its disposal in accordance with the input from the sewage treatment operators. The disposal procedures shall be documented.

11.2.3 An emergency spill of liquid waste into the drainage system of the central waste store is not considered disposal via the sewage system. The responsible officer at the central waste store shall

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inform the relevant authorities in the event of such a spill.

11.2.4 The following healthcare risk waste have specific discharge consents or restrictions and shall not be discharged to a sewer:

- a) pharmaceutical waste, which can comprise prescription-only medicines that are subject to special waste regulations; and
- b) all heavy metals (e.g. mercury, cadmium and chromium).

11.2.5 The following radioactive waste may be disposed of into a sewer in accordance with the relevant requirements and regulations of the current relevant national legislation (see annex A).

- a) Aqueous solutions of radioactive material.
- b) Macerated biological material from diagnosis and intensive radiotherapy.

11.2.6 Sanitary products that contain plastics material shall not be disposed of into a sewer.

11.3 Disposal of healthcare risk waste by incineration

11.3.1 Healthcare risk waste may be disposed of by incineration. The incineration facility shall be approved and authorized in accordance with the relevant requirements and regulations of the current relevant national legislation (see annex A).

11.3.2 Where category A waste is disposed of by incineration, the waste shall be incinerated as soon as possible upon arrival.

11.3.3 The ash or residue produced from the incinerator shall be classified by hazard rating (see table D.1) for disposal at a landfill in accordance with the relevant requirements and regulations of the current relevant national legislation (see annex A).

11.3.4 Restrictions on emissions, structural requirements and the operating parameters of the treatment plant or disposal plant (or both) shall comply with the requirements of the relevant requirements and regulations of the current relevant national legislation (see annex A).

11.3.5 Healthcare risk waste that contains heavy metals, (e.g. mercury or cadmium) shall not be incinerated or disposed of in general municipal landfills. This waste shall be treated for encapsulation in accordance with the relevant requirements and regulations of the current relevant national legislation (see annex A) or it shall be treated for recovery.

11.3.6 Waste that contains poly(vinyl chloride) (PVC) should preferably not be incinerated. Incineration of PVC produces hydrochloric acid and the formation of dioxin. The difficulties associated with the incineration of PVC can be overcome by substituting PVC products with non-PVC products (see E.4.1), ensuring that the operating parameters (e.g. temperature of the incinerator) are maintained, and equipping incinerators with a suitable flue gas cleaning system.

NOTE Incinerators equipped with a suitable flue gas cleaning system, e.g. adding lime or sodium bicarbonate and activated carbon, followed by fabric or ceramic filters, reduces the acid gas and dioxin emissions.

11.3.7 If applicable, environmental impact assessment studies shall be done on all incinerators or disposal facilities (or both) in accordance with the relevant requirements and regulations of the current relevant national legislation (see annex A). The assessments shall include the performance levels of the incineration or disposal facility (or both) in accordance with the air emission guidelines of the relevant requirements and regulations of the current relevant national legislation (see annex A).

11.4 Disposal of healthcare risk waste by alternative technologies

11.4.1 An alternative technology (e.g. autoclave, microwave and chemical disinfection) may be used for the treatment or disposal (or both) of healthcare risk waste in accordance with the relevant requirements and regulations of the current relevant national legislation (see annex A). The alternative technology shall be approved by the relevant authority and shall comply with the relevant requirements and regulations of the current relevant national legislation (see annex A).

11.4.2 The alternative treatment or disposal equipment (or both) shall be appropriate for the categories of healthcare risk waste that can be treated.

11.4.3 The alternative technology shall provide efficient sterilization or disinfection in accordance with the relevant requirements and regulations of the current relevant national legislation (see annex A).

11.4.4 Where category A waste is treated using alternative technologies, the waste shall be treated as soon as possible upon arrival.

11.4.5 When human and animal anatomical waste, and chemical and pharmaceutical waste are treated by alternative technologies, the resulting residue shall be rendered unrecognizable.

11.4.6 The residue from the treatment shall be hazard rated (see annex D) in accordance with the relevant requirements and regulations of the current relevant national legislation (see annex A) for disposal by landfill.

11.5 Authorized treatment facilities operated on-site at healthcare facilities

11.5.1 Operational requirements

11.5.1.1 An on-site incinerator or alternative healthcare risk waste treatment facility shall be operated in accordance with the manufacturer's specifications and the conditions of authorization from the relevant authority.

11.5.1.2 The operational procedures shall be supervised to prevent damage to the equipment by the waste stream.

11.5.1.3 The water used in wet de-ashing systems for cooling shall be sufficient for the process to prevent any water effluent. For systems with water effluent, the water shall be evaluated for environmental impact and shall be disposed of in accordance with the relevant requirements and regulations of the current relevant national legislation (see annex A).

11.5.2 Records

11.5.2.1 Records shall be kept of the operational procedures at authorized treatment facilities for auditing purposes.

11.5.2.2 Records shall be maintained of the mass of the ash or residue produced, and the appropriate hazard rating classification for disposal to a hazardous (H) or a general (G) landfill.

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11.6 Authorized treatment facilities operated off-site from healthcare facilities

11.6.1 Operational requirements

11.6.1.1 The incinerator or alternative treatment facility or disposal facility (or both) of the waste management contractor or subcontractor shall comply with the relevant requirements and regulations of the current relevant national legislation (see annex A).

11.6.1.2 The incinerator or alternative treatment facility or disposal facility (or both) shall be approved and authorized for the treatment of the different categories of healthcare risk waste by the approving authority.

11.6.1.3 The residue from the incineration or alternative treatment process shall be disposed of into an appropriate landfill (see 11.3.3).

11.6.1.4 The incinerator or alternative treatment facility of the waste management contractor or subcontractor shall be adequate for the capacity of waste to be treated.

11.6.2 Records

11.6.2.1 The waste management contractor shall have appropriately documented work instructions.

11.6.2.2 Records shall be kept of the treatment and disposal of the waste.

11.6.2.3 The waste management officer shall audit the incineration or alternative treatment facility or disposal facility (or both) at least once a year.

Annex A
(normative)

National legislation and other publications

References are made in the document to compliance with “the relevant requirements and regulations of the current relevant national legislation”. The current relevant national legislation and other publications applicable in South Africa are indicated by subclause as given in table A.1.

Table A.1 — National legislation and other publications

1	2
Act, regulation and other publications	Subclause
Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965)	4.1.2(f), 5.6.5, 9.3.1.3, 11.3.4
Environment Conservation Act, 1989 (Act No. 73 of 1989)	4.1.2(g), 5.1.2, 5.3.1, 5.3.2, 5.6.5, 11.1.2, 11.3.5, 11.3.7, 11.4.1, 11.5.1.3, 11.6.1.1
Explosives Act, 1956 (Act No. 26 of 1956)	D.1.1
Hazardous Substances Act, 1973 (Act No. 15 of 1973)	4.2.6(a), 6.2
National Environmental Management Act, 1998 (Act No. 107 of 1998)	4.1.2(f), 4.1.2(g), 5.3.2, 11.3.1, 11.3.4, 11.3.7, 11.4.1, 11.5.1.3, 11.6.1.1
National Road Traffic Act, 1996 (Act No. 93 of 1996)	6.2, 9.3.2.1
Occupational Health and Safety Act, 1993 (Act No. 85 of 1993)	4.1.1, 4.2.8(b), 5.2.2(g), 5.6.5, 5.8.2, 5.8.3,
Gauteng healthcare waste management regulations, 2004	4.1.2(e), 7.1.3, 8.2.8, 9.3.1.3, 9.3.1.5, 9.3.2.2, 11.3.1, 11.4.1, 11.4.3, 11.6.1.1
Department of Water Affairs and Forestry, <i>Minimum requirements for the handling, classification and disposal of hazardous waste</i> , (third edition) 2005	11.2.5, 11.3.3, 11.3.5, 11.4.6
Department of Water Affairs and Forestry, <i>Minimum requirements for waste disposal by landfill</i> , (second edition) 1998	5.4.2(j), 11.1.2, 11.3.5, 11.4.6
Department of Health, Directorate of Radioactive Control, – <i>Code of practice for the management and disposal of non-nuclear radioactive waste</i> , WSCP91-1, May 2005. – <i>Guidelines for the safe transport of radioactive material</i> , May 2005. – <i>Requirements for the safe use of unsealed radioactive nuclides</i> , May 2005.	7.6.8.2, 7.6.8.4.2, 7.6.8.4.3, 9.3.2.1, 11.2.5

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Annex B
(normative)

Contractual commitments

B.1 A written contractual agreement shall be concluded between the healthcare facility and the waste management contractor for the collection and treatment or disposal (or both) of healthcare risk waste off-site. The contract shall set out at least the following:

- a) the specification or description of the types (categories) and volume of healthcare risk waste to be collected for treatment or disposal (or both);
- b) where relevant, the treatment or the disposal process to be used, taking account of any special requirements;
- c) a method to account for the number of different healthcare risk waste units collected by the waste management contractor;
- d) the verification of the physical condition of the healthcare risk waste packages received;
- e) infection risks and other hazards associated with the waste;
- f) the responsibility to sort, count and collect the healthcare risk waste packages;
- g) a timed collection schedule designed to ensure that the waste types are not mixed when collected and transported;
- h) the health and safety measures to be implemented, including immunization and personal protective equipment to be used;
- i) transitional arrangements during mobilisation and termination of services, including interfaces with the current waste management contractor and the succeeding waste management contractor;
- j) the acceptable behaviour of personnel when collecting the waste at the healthcare facility; and
- k) the reporting requirements, including the parameters, format and frequency.

NOTE The contract can be between the tender board (provincial or national) and the waste management contractor.

B.2 Where possible, emergency collection and treatment or disposal procedures (or both) that offer "low risk" to the public and the environment when the contracted system fails shall be agreed upon by the healthcare facility and the waste management contractor, e.g. arrangement with other treatment or disposal facilities (or both) where available.

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Annex C
(informative)

Examples of documents

C.1 Example of a destruction certificate issued by a waste management contractor or a service provider to a waste generator

Certificate No:101

DESTRUCTION CERTIFICATE (SAFE DISPOSAL)

Date:

Client or Company Name:.....

Full Address:

Attention:

Dear Sir/Madam

This letter serves to confirm that (*Name of Waste Contractor*) disposed of the following medical waste on your behalf:

Date treated/destroyed:.....

Waste collection No.	Date received	Items	Weight kg
173907	18.04.07	9 × 5 L sharps	11,50
		1 × 140 L box	10,0
Total weight			21,50

Should you require any further information please do not hesitate to call or e-mail us.

Sincerely

Signed:

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C.2 Example of a receipt issued by a waste management contractor on collection of waste

Waste Collection				
Waste management contractor's Letterhead and Details				
Address:				
Telephone number:				
Fax number:				
Generator's Name:			Generator's Address:	
Telephone number:				
Fax number:				
Cell number:				
Date:		Driver's Name:		Order number:
Shipping Name	UN No.	Hazard Class	Packing Group	Vehicle Registration Number
Medical Waste	3291	6.2	II	MWC 531 yyy
SPECIAL INSTRUCTIONS:				
Page 1 of 2				

C.2 (concluded)

COLLECTION:					DISPOSAL:				
ITEM	VOLUME	TYPE OF PACKAGING	QTY	TOTAL WGT	ITEM	VOLUME	TYPE OF PACKAGING	QTY	TOTAL WGT
GENERATOR'S CERTIFICATE					WARNING				
I hereby declare that the contents are properly described, packaged, marked and labelled before transportation in accordance with all relevant legislation.					Failure to comply in all respects with the regulations on the transportation of dangerous goods promulgated in terms of the National Road Act, 1996 (Act No. 93 of 1996), will constitute a criminal offence.				
NAME:					TRANSPORTERS ACKNOWLEDGMENT OF RECEIPT OF MATERIALS				
SIGNED:									
NAME:					NAME:				
SIGNED:					SIGNED:				
DESTRUCTION VERIFICATION									
DISPOSAL									
Received:					Disposed by:				
Signature:									
Date:					Date:				

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Annex D
(normative)

Hazard classes and hazard rating

D.1 Hazard classes

D.1.1 Class 1: Explosives

Explosives of class 1 are regulated by the relevant requirements and regulations of the current relevant national legislation (see annex A). The classification, transportation and disposal of explosives shall be approved by the relevant competent authority.

NOTE Class 1 is included for the sake of completeness since it is considered unlikely that class 1 waste will arise as part of healthcare risk waste.

D.1.2 Class 2: Gases

This class is subdivided as follows:

- a) **division 2.1:** flammable gases;
- b) **division 2.2:** non-flammable non-toxic gases; and
- c) **division 2.3:** toxic gases.

D.1.3 Class 3: Flammable liquids

This class comprises liquids with a closed-cup flash point not exceeding 60,5 °C.

D.1.4 Class 4: Flammable solids; substances liable to spontaneous combustion; substances that, on contact with water, emit flammable gases

This class is subdivided as follows:

- a) **division 4.1:** flammable solids;
- b) **division 4.2:** substances liable to spontaneous combustion; and
- c) **division 4.3:** substances that, on contact with water, emit flammable gases.

D.1.5 Class 5: Oxidizing substances and organic peroxides

The class is subdivided as follows:

- a) **division 5.1:** oxidizing substances; and
- b) **division 5.2:** organic peroxides.

D.1.6 Class 6: Toxic and infectious substances

This class is subdivided as follows:

- a) **division 6.1:** toxic substances; and

b) **division 6.2:** infectious substances.

D.1.7 Class 7: Radioactive material

This class comprises materials that spontaneously emit ionizing radiation.

D.1.8 Class 8: Corrosives

This class comprises substances that, by chemical action, cause damage to living tissue, to commonly used metals or to other packaging.

D.1.9 Class 9: Miscellaneous dangerous substances

This class comprises any substance not covered by all the other classes, but that has been or could be shown by experience to be of such dangerous character that the provisions of this class should apply to it.

D.2 Hazard rating

D.2.1 The hazard rating and the type of healthcare risk waste, or the resultant residue after treatment, are indicated in table D.1.

Table D.1 — Healthcare risk waste hazard rating

1	2	3	4
Hazard rating	Hazard	Waste or residue	Landfill site
Hazard rating 1	Extreme hazard	Extreme toxic substances such as infectious waste, carcinogens and teratogens (e.g. mercury, dioxins and polychlorinated biphenyls)	H:H ^a landfill
Hazard rating 2	High hazard	High toxic class A and class B carcinogens and mutagens that are not persistent in the soil (e.g. arsenic trioxide and benzene)	H:H landfill
Hazard rating 3	Moderate hazard	Moderate toxic class C and class D substances that are potentially harmful to human health or to the environment but are not persistent in the soil (e.g. phenols and fluorides)	H:H landfill or H:h ^b landfill
Hazard rating 4	Low hazard	Substances in large quantities and in concentrations that represent only a limited threat to human health or to the environment (e.g. ethanol and acetic acid)	H:h landfill
<p>^a An H:H landfill site can receive all types of hazardous waste, including waste with a hazard rating 1 and a hazard rating 2.</p> <p>^b An H:h landfill site can only receive hazardous waste with a hazard rating 3 and a hazard rating 4.</p> <p>NOTE For a list of substances that fall under class A, class B, class C and class D, see the Department of Water Affairs and Forestry's <i>Minimum requirements for the handling, classification and disposal of hazardous waste</i>.</p>			

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D.2.2 Healthcare risk waste or the residue from the treated waste with a hazard rating below 1 can be considered as a low hazard. Approval for the disposal of the low hazard waste in an approved general waste landfill site shall be obtained from the relevant approving authority. This site shall be equipped with a leachate collection system.

Annex E
(informative)

'Green' procurement

E.1 Introduction

E.1.1 The damage caused to the environment and to human health by toxic substances released by the incineration of waste, especially medical devices and products, has resulted in the creation of 'green' products (alternative products).

NOTE The emissions that are of concern are dioxin and mercury gas. The introduction of 'green' procurement procedures, with particular focus on product substitution (alternative products), can significantly reduce the negative impacts of healthcare waste.

E.1.2 The benefits of a successful 'green' procurement programme can:

- a) reduce liability costs and the cost of reactive interventions;
- b) improve occupational health;
- c) reduce the harmful impact on the environment and human health in general;
- d) improve positive publicity for the healthcare facility; and
- e) reduce the cost of waste disposal.

E.2 'Green' procurement procedures

The development of procedures for 'green' procurement should be in accordance with the environmental management policy and should include criteria for the evaluation of products that:

- a) are safer and less harmful to human health and to the environment;
- b) require that less resources be used (e.g. water);
- c) are energy efficient;
- d) require less packaging;
- e) contain a high-recycled content;
- f) are fragrance-free, without unnecessary colour and are unbleached;
- g) do not contain dyes and material that contains heavy metals; and
- h) are reusable or suitable for recycling.

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E.3 Implementation of 'green' procurement procedures

E.3.1 Organizational support

The implementation of the 'green' procurement procedures will only succeed with the support from all levels in the healthcare facility, including senior management and cleaners. 'Green' procurement should be part of the environmental management policy.

E.3.2 Evaluation

An evaluation of the current purchasing system should be conducted before the implementation of the 'green' procurement procedures. This evaluation should include the quantities of purchases, the types of purchases, prices and the suppliers. A survey should be conducted to determine if suppliers and manufacturers are aware of 'green' products and the availability of the products. The information will provide a basis from which to develop the 'green' procurement procedures.

E.3.3 Strategy

Inform all role players, e.g. users of the products in the healthcare facility, suppliers and manufacturers of the impending development of 'green' procedures. A good business relationship with suppliers and manufacturers can facilitate the implementation of the procedures. Ask the suppliers and manufacturers to provide the environmental aspects (features) of products when new products are purchased.

E.3.4 Compilation of information

The information from the evaluation and surveys should identify:

- a) the short-term and long-term changes that can be made;
- b) suitable products;
- c) the quantities of material purchased to reflect the needs;
- d) provisions for the treatment or disposal (or both) of waste before the purchasing of material; and
- e) the environmental performance of suppliers.

E.3.5 Implementation

E.3.5.1 A specific product can be used as a trial to obtain detailed information on the problems that might arise before the implementation of the 'green' procurement procedures.

E.3.5.2 When the 'green' procurement procedures are implemented, the following should be included:

- a) a target and goal setting plan for specific activities, e.g. the reduction of the amount of packaging waste by 20 % in 2 years;
- b) training, e.g. employees need to be educated on the importance of the use of 'green' products;
- c) audits to evaluate the progress and success of the targets and goals; and
- d) a review of the procedures that takes into account changes in environmental regulations.

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E.4 'Green' products

E.4.1 The following are examples of products that can be used as alternatives to products that contain PVC:

- a) gloves made from latex, polyurethane or nitrile;
- b) IV bags made from non-PVC polymer, e.g. polypropylene or polyolefins;
- c) IV administration sets made from polyethylene, polypropylene or non-DEHP PVC;
- d) plasma collection bags made from EVA resin; and
- e) sharps containers made from polyethylene.

NOTE Rigid products made from PVC can be substituted by metal, polypropylene or polycarbonate.

E.4.2 The following are examples of products that can be used as alternatives to products that contain mercury:

- a) thermometer: tympanic ear thermometer, digital thermometer or alcohol thermometer;
- b) sphygmomanometer: aneroid blood pressure devices;
- c) amalgam: ceramics, porcelain, polymers or gold;
- d) batteries: alkaline, zinc or lithium;
- e) fluorescent bulbs;
- f) fixative B5: zinc formalin;
- g) hematoxylin: sodium iodate or mercury-free hematoxylin;
- h) mercurochrome: neosporin or mycin; and
- i) esophageal dilators: silicon-filled or tungsten-filled dilators.

E.4.3 Paper and wrappings can be sent for recycling.

E.4.4 Where possible, redundant electronic equipment can be sold to industries specializing in recovery of certain metals, e.g. lead in cathode ray tubes.

E.5 Functions of the procurement manager

The procurement manager of a healthcare facility should:

- a) develop procedures for 'green' procurement in accordance with the environmental management policy;
- b) purchase all packaging material and equipment in accordance with the environmental management policy;
- c) identify opportunities to minimize waste production when purchasing packaging material;
- d) purchase material that will meet the treatment or disposal requirements of the waste

- management policy, e.g. purchasing PVC-free medical devices;
- e) negotiate with manufacturers to have a take-back policy for the end of life of equipment; and
 - f) inform suppliers and manufactures about the environmental management policy of the healthcare facility.

Annex F (normative)

Hazard labelling

F.1 The international hazard labels for transportation shall be in the form of a square, set at an angle of 45° (diamond-shaped), and with minimum dimensions as given in table F.1. The hazard label shall have a line that is the same colour as the symbol, 5 mm inside the edge of the hazard label and parallel with it in the case of a label of dimensions of 100 mm². For labels of other sizes, the distance of the line from the edge shall be reduced or increased in proportion to the size of the label.

Table F.1 — Sizes of hazard labels

1	2
Net contents of packaging ^a	Minimum size of label mm
≥ 0,5	15 × 15
> 0,5 ≤ 5	20 × 20
> 5 ≤ 20	30 × 30
> 20	100 × 100

^a Litres in the case of a liquid or gas and kilograms in the case of a solid substance.

F.2 The hazard labels are divided into halves (see table F.2). With the exception of divisions 1.4, 1.5 and 1.6, the upper half of the label is reserved for the pictorial symbol and the lower half for text, the class or division number and the compatibility group, as appropriate.

NOTE Class 1 is included for the sake of completeness since it is considered unlikely that class 1 waste will arise as part of healthcare risk waste.

F.3 The colours of the hazard labels shall visually match colour reference numbers Pantone 151 or NCS S 0570-Y50R (orange), Pantone 192 or NCS S 0580-Y90R (red), Pantone 361 or NCS S 1565-G (green), Pantone 300 or NCS S 2065-B (blue) and Pantone 109 or NCS S 0570 G90Y (yellow). In case of a dispute, the NCS colours shall take precedence.

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Table F.2 — International hazard labels

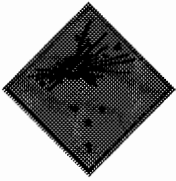









1	2
Class, division or subsidiary risk	Hazard label
1.1, 1.2, or 1.3	 <p style="text-align: right;">(See NOTES 1 and 2)</p>
1.4	 <p style="text-align: right;">(See NOTE 2)</p>
1.5	 <p style="text-align: right;">(See NOTE 2)</p>
1.6	 <p style="text-align: right;">(See NOTE 2)</p>
<p>NOTE 1 Insert the division for explosives (see SANS 10228) in the space marked * *. To be left blank if explosive is the subsidiary risk.</p> <p>NOTE 2 Insert the compatibility group (see SANS 10228) in the space marked *, denoted by a letter A to N (excluding I and M) and S as indicated in SANS 10228. To be left blank if explosive is the subsidiary risk.</p>	

Table F.2 (continued)

1	2
Class, division or subsidiary risk	Hazard label
2.1	
2.2	
2.3	
3	
4.1	
4.2	

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Table F.2 (continued)

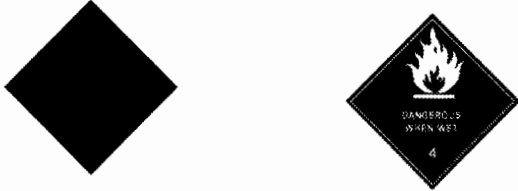









1	2
Class, division or subsidiary risk	Hazard label
4.3	
5.1	
5.2	
6.1	
6.2	

Table F.2 (concluded)

1	2
Class, division or subsidiary risk	Hazard label
7	
7	
7	
8	
9	 <p data-bbox="898 1552 975 1574">Drg.492a-></p>

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