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The handling, storage and disposal of pesticides

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Compliance with this standard does not, of itself confer immunity from legal obligations

A Uganda Standard does not purport to include all necessary provisions of a contract. Users are responsible for its correct application

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Foreword

Uganda National Bureau of Standards (UNBS) is a parastatal under the Ministry of Trade, Industry and Cooperatives established under Cap 327, of the Laws of Uganda, as amended. UNBS is mandated to co-ordinate the elaboration of standards and is

(a) a member of International Organisation for Standardisation (ISO) and

(b) a contact point for the WHO/FAO Codex Alimentarius Commission on Food Standards, and

(c) the National Enquiry Point on TBT Agreement of the World Trade Organisation (WTO).

The work of preparing Uganda Standards is carried out through Technical Committees. A Technical Committee is established to deliberate on standards in a given field or area and consists of key stakeholders including government, academia, consumer groups, private sector and other interested parties.

Draft Uganda Standards adopted by the Technical Committee are widely circulated to stakeholders and the general public for comments. The committee reviews the comments before recommending the draft standards for approval and declaration as Uganda Standards by the National Standards Council.

The committee responsible for this document is Technical Committee UNBS/TC 10, *Management and services*, Subcommittee SC 4, *Pest control services*.

Introduction

Although strict safety measures apply in factories where pesticides are manufactured and formulated, members of the public in general should be made aware of the measures to be taken to ensure that their actions, whether out of ignorance or out of inconsiderateness, do not result in harm to themselves or others, or to the environment. The various risks associated with the handling of pesticides have been the subject of many discussions and publications. Pollution of the environment has recently become a very sensitive issue, publicity of which often incites the public against the use of all pesticides. Pesticides, whether used in public health, in agriculture or in animal husbandry, are used to the benefit of man. The public should be reassured that, if pesticides are used in accordance with the instructions on the label and if the warnings on the label are heeded, contamination of the environment and the possibility of poisoning can be avoided. The prevention of poisoning is easier than its treatment. The aim of this standard is to supply general guidelines to all users of pesticides on how to minimize the risks involved when pesticides are handled. All users of pesticides should nevertheless be knowledgeable about basic first-aid measures in case of suspected poisoning.

The handling, storage and disposal of pesticides

1 Scope

This Draft Uganda Standard specifies the procedures and requirements for the handling, storage and disposal of pesticides by household users, farmers, pest control operators, distributors, manufacturers, formulators packers and re-packers to ensure the least risk to health and safety to property and the environment.

First-aid actions to be taken in the case of an incident, and firefighting procedures, are also covered.

2 Normative references

The following referenced documents referred to in the text in such a way that some or all of their content constitutes requirements 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.

US 1792-1, Classification of pesticides and stock remedies — Part 1: Pesticides for sale and handling.

US ISO 7010, *Graphical symbols — Safety colours and safety signs — Registered safety signs*

US ISO 7159, *Fire fighting — Portable fire extingushers — Performance and construction*

US ISO 11602-2, *Fire protection — Portable and wheeled fire extinguishers — Part 2: Inspection and maintenance*

US ISO 7240-14:2013, Fire detection and alarm systems-Part 14: Design, installation, commissioning and service of fire detection and fire alarm systems in and around buildings.

US IEC 62305-1:2010, Protection against lightning – Part 1: General principles

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1
agricultural remedy
any chemical or biological, or any mixture or combination of any substance intended or offered to be used for the destruction, control, repelling, attraction or prevention of any undesired microbe (fungi and bacteria), algae, acarina, nematodes, insects, plants, vertebrates, invertebrates, or their effects

3.2
agriculture
raising of plants or animals for economic use;

3.3
decontamination
removal of detectable traces of pesticide from containers, equipment and contaminated surfaces, by washing them with detergent or with any other cleaning solution prescribed by the manufacturer, or by chemical degradation

3.4
disposal
intentional burial, depositing, discharging, dumping, placing or release of pesticide waste material into or on any air, land or water in a specified facility (for example near surface or geological repository), or direct discharge of effluents into the environment without the intention of retrieval in accordance with the relevant national regulations and local regulatory requirements

NOTE See annex A.

3.5
dust
finely divided solid particles of diameter ≤10 µm, usually generated by the processing (crushing, grinding, etc.) of materials

3.6
gas proof sheet
sheet that prevents significant loss of gas or vapour to the atmosphere

3.7
handling
any conditioning, transferring, dividing, transporting and applying of the pesticide

3.8
intensive handling
handling of pesticides on a regular or routine basis

3.9
mist
airborne liquid droplets of negligible volatility

3.10
occasional handling
infrequent handling of pesticides by persons who do not handle pesticides as part of their daily work

3.11
operation area
area where pesticides are handled or disposed of, as relevant

3.12
operator
person handling pesticides

3.13
pest
any form of plant or animal life or any pathogenic agent, other than a beneficial organism, capable of directly or indirectly injuring any plant material or beneficial organism, and includes weeds

3.14
pesticide
a chemical which, by virtue of its poisonous properties is used to kill pests

3.15
pest control operator
operator registered in terms of the relevant local and national regulations

NOTE See annex A.

3.16
salvage packaging
special packaging into which damaged, defective, or leaking or non-conforming dangerous goods packages, or goods that have been spilled or leaked, are placed for purposes of transport for recovery or disposal

3.17
segregation
positioning of pesticides of different classes or divisions in separate areas within a pesticide store or warehouse

NOTE The concepts "segregation" and "separation" are subject to widespread misinterpretation in industry; considerable differences in usage exist, and there is no universally accepted set of definitions of these terms. The onus is nevertheless on the person(s) responsible for a pesticide storeroom or store, and on a pesticide warehouse controller, to ensure that pesticides are stored in a safe and responsible manner at all times.

3.18
separation
physical separation of different pesticide groups, either into separate stores or warehouses or by means of separating elements such as a wall that has a specific fire resistance and that is used between divisions, occupancies or tenancies in a building

NOTE See the note to 3.17

3.19
toxicity
ability of a substance to cause damage to living tissue, impairment of the central nervous system, severe illness, or, in extreme cases death, when ingested, inhaled or absorbed by the skin

3.20
triple-rinse
allow the container or the measuring vessel that is being emptied to drain into the spray tank or mixing tank for 30 s after the flow has slowed to a drip, then rinse it three times, each time using a volume of the normal diluent equal to at least 10 % of the capacity of the container, and adding the rinse liquid to the spray mixture or disposing of the rinse liquid by a method suitable for the disposal of the pesticide

3.21
waste disposal site
site that is licensed for the disposal of hazardous waste under the relevant national regulations and local regulatory requirements

NOTE See annex A.

4 Toxicity and other hazards of pesticides

4.1 Hazardous conditions such as corrosiveness, flammability, combustibility, toxicity or danger to the environment (or a combination of these) might be present when a pesticide is handled. Certain solvents and fumigants might cause a fire when they are used in the presence of naked flames or other sources of ignition, for example an electrical wire. If a warning to this effect is given on the pesticide label, care shall be taken to ensure that no appliances are left in operation and that all pilot flames are extinguished before application operations are started.

NOTE See US 1792-1 Classification of pesticides and stock remedies — Part 1: Pesticides for sale and handling.

4.2 Unless adequately protected, no person shall be allowed near an area that has accidentally been contaminated with pesticides. Failure to take this precaution endangers both the person and emergency rescue personnel. It shall be borne in mind that, at first approach, hazards such as flammability, corrosiveness or toxicity, or any combination of these, might be present.

4.3 During handling, decontamination and disposal procedures, the appropriate protective clothing and equipment described in clause 7 shall be worn.

4.4 Information about the toxicity of, the symptoms produced by, and the treatment of, poisoning by a pesticide is obtainable from the manufacturer of the compound(s) in question by means of a material safety data sheet (MSDS) (see 5.1).

4.5 An empty pesticide container shall never be re-used for any purpose other than to hold the same product. If not re-used in this way, an empty pesticide container shall be triple-rinsed (see 3.20) and disposed of immediately as indicated in the relevant clauses of this standard.

4.6 Pesticides shall not, under any circumstances, be poured into utensils which are used for (or are intended to be used for) food preparation or drinking water, or for the containment of any other drinks or food.

4.7 If a medical station and personnel is not provided, a stocked first-aid kit, in accordance with B.5, shall be kept on hand at all times and information regarding the nearest medical facility provided with trained personnel when pesticides are being handled.

5 Regulatory compliance

5.1 Material Safety data sheets (MSDSs)

5.1.1 Every supplier, manufacturer, importer or distributor of a pesticide intended for use in the workplace shall, as far as is practicable, provide the party receiving such a pesticide with a MSDS, free of charge.

5.1.2 Any new information on the pesticide that becomes known to the supplier, manufacturer, importer or distributor shall be forwarded to the recipient of the MSDS, free of charge.

5.1.3 A MSDS need not be supplied when a pesticide, offered or sold in the retail trade, is furnished with sufficient information to enable users to take the necessary measures with regard to the protection of health and safety. However, a MSDS shall be supplied at the request of any interested or affected person.

5.1.4 A manufacturer, importer or distributor of a pesticide should provide the relevant authority with a copy of the MSDS for each pesticide he provides.

5.2 Health and safety

5.2.1 General

5.2.1.1 With regard to health and safety, the relevant national regulations and local regulatory requirements (see annex A) shall be adhered to. The threshold limit values promulgated in terms of the regulations shall not be exceeded, unless adequate personal protection is supplied to the operators involved.

5.2.1.2 If relevant, the health precautions prescribed by the medical policy of a national or international company shall be followed.

5.2.1.3 For each team of operators engaged in the handling of pesticides, a supervisor shall be appointed who has adequate knowledge of, and experience in, the application and hazards of pesticides. Knowledge of basic first aid is mandatory.

5.2.1.4 For work involving exposure to pesticides, only operators who have been medically examined and found to be fit shall be employed.

5.2.1.5 All operators shall receive practical training and shall not be allowed to handle pesticides unless they know the risks involved and the precautions to be taken.

5.2.1.6 A pesticide shall not be used on humans, animals or the environment unless it is stated on the label that the pesticide can safely be used for this purpose.

5.2.2 First-aid training

At least two members of each team of operators shall be trained in the application of basic first aid in accordance with annex B.

The pesticide dispensers shall endeavor to sensitise home and farm users about the basic first aid given incase of accidents/emergencies

5.2.3 Work-exposure records

5.2.3.1 An employer shall keep medical records and records of exposure information for every personnel exposed to pesticides. The contents of the medical records shall be accessible only to an occupational medical practitioner, the personnel, and any other person nominated in writing by the said worker.

5.2.3.2 An employer shall keep record of the investigation of each incident by completing the relevant form(s) as stipulated by the national department that deals with labour issues. The personnel involved is entitled to have a copy of such an investigation and the record shall be open for inspection by an inspector of the said national department.

5.2.3.3 All records shall be kept for a minimum period of 30 years. If the employer ceases activities, the records of all the workers shall be handed over, or forwarded by registered post, to the relevant regional representative of the national department that deals with labour issues.

5.2.4 Minimum requirements for health surveillance

5.2.4.1 An initial health evaluation shall be carried out by an occupational medical practitioner immediately before employment, or within 14 days of commencement of employment. The health evaluation shall comprise the following:

a) an evaluation of the operator's medical and occupational history;

b) a full physical examination; and

c) any other examination (for example blood tests) which, in the opinion of the occupational medical practitioner, is desirable in order to do a proper evaluation.

5.2.4.2 An operator who handles pesticides on a regular or routine basis shall undergo a medical examination at intervals not exceeding two years, or more often as indicated for the particular pesticide and at the discretion of an occupational medical practitioner.

NOTE Operators who handle pesticides on a regular or routine basis include pest control operators, farm workers and companies whose trade involves pesticides.

5.2.4.3 An operator involved in the handling of pesticides shall be under medical surveillance if the exposure to any pesticide is such that an identifiable disease or adverse health effect can be related to the exposure.

5.2.4.4 An operator who is suffering from any ailment, or who is taking medication, that would aggravate or suppress the symptoms of poisoning by a pesticide shall not be permitted to handle such a pesticide or

another type of pesticide unless prior approval (endorsed on the operator's work-exposure record card) has been obtained from an occupational medical practitioner.

5.2.4.5 If any symptom of illness or discomfort is experienced (for example headache, dizziness, vomiting, diarrhoea, difficulty in breathing or tightness of the chest) or if abnormal behaviour becomes apparent after a pesticide has been handled, an occupational medical practitioner shall be consulted immediately.

5.3 Labels

5.3.1 Each container and each bulk package shall bear in prominent, legible, and indelible marking with the following additional information:

a) common name as 'pesticide';

b) manufacturer's name and physical address;

c) net mass of the material when packed;

d) instructions for use and disposal;

e) warnings;

f) country of origin

g) storage recommendation;

h) batch identification number/code;

i) date of manufacture and

j) date of expiry.

5.3.2 Each package shall be marked with appropriate safety symbols as specified in US ISO 7010.

5.3.3 The sale, acquisition, use and disposal of a pesticide other than in a container and with a label as approved by the relevant national authority are strictly prohibited, unless:

a) the pesticide is applied for the purpose of conducting trials, and

b) prior approval has been obtained from the Registrar.

5.4 Maintenance of a pesticide register

5.4.1 A pesticide register shall be kept at every warehouse, store, outlet and depot for pesticides classified as danger group I (a) or danger group I (b) pesticides in terms of US 1792-1

5.4.2 The pesticide register poison register shall be printed or be in electronic format, and shall contain at least the following information:

a) name of the product;

b) batch number;

c) date of manufacture;

d) date of expiry;

e) date of receipt;

f) name and address of the supplier;

g) quantity received and dispatched;

h) quantity used;

NOTE This applies to all pesticides that have been drawn from the store or warehouse.

i) balance after dispatch or use;

j) name and address of purchaser or user; and

k) purpose for which the product is to be used.

NOTE This applies to all pesticides that have been drawn from the store or warehouse.

6 Health facilities, emergencies and accidents

6.1 The locality of the nearest hospital or health facility, the hours of attendance and telephone numbers of the local emergency services shall be determined. Transport to take a poison victim to the nearest medical practitioner or hospital shall be available and within easy reach. In the case of field work, communication equipment shall be available to summon help when necessary.

6.2 The nearest health facility shall routinely be supplied with information about the products being handled and the antidotes required, to ensure that the correct procedure and antidotes are available should an emergency arise.

7 Personal protective clothing and equipment

7.1 General

7.1.1 All protective garments shall be thoroughly washed with soap or detergent and water at the end of each operation.

7.1.2 When a pesticide is being handled, the instructions on the MSDS or the label (as applicable) shall be followed, taking cognizance of all special precautions concerning protective clothing and equipment, irrespective of occasional handling or intensive handling, and irrespective of the quantity of pesticide used.

7.1.3 All operators shall clearly understand that, even though protective clothing and equipment are used, great care shall still be taken.

7.1.4 All protective clothing and equipment shall be collected at the end of each day or at the end of each operation, as applicable. No used protective clothing or equipment shall be worn unless it has been thoroughly washed or decontaminated.

7.1.5 An employer shall ensure that no worker removes dirty or contaminated clothing or equipment from the premises. Dirty or contaminated clothing or equipment to be disposed of, or washed, or decontaminated outside the premises, shall be treated as hazardous chemical goods in accordance with the relevant national regulations and local regulatory requirements (see annex A).

7.1.6 Provide for separate rooms for changing and storage of both “protective” and “personal” clothing Separate "clean" and "dirty" change rooms shall be available if pesticides are used to such an extent that they could endanger the health of persons outside the workplace

7.2 Overalls

7.2.1 General

7.2.1.1 Cotton is one of the most effective, durable and comfortable materials for an overall. A cotton overall shall be made of 100 % cotton with a mass per area of 110 g/m2 and should preferably have elasticized cuffs and no pockets. Alternatively, an overall shall be made of lightweight synthetic material specifically developed for the protection of operators working with pesticides.

7.2.1.2 An overall shall:

a) be impervious to pesticide formulations,

b) be durable,

c) give splash and droplet protection,

d) be comfortable,

e) be light in weight, and

f) be light in colour so as to permit visual identification of contamination.

7.2.2 Overalls for spraying operations

7.2.2.1 An overall for spraying operations shall be a two-piece garment consisting of a jacket with a hood and trousers, or a one-piece garment with a hood so designed that the:

a) hood closes round the gas mask,

b) sleeves close at the wrists with elasticized cuffs,

c) trousers have elasticized closures round the ankles and the waist, and ;

d) jacket hem of a two-piece garment seals on the hips.

7.2.2.2 An overall for spraying operations shall:

a) be impervious to pesticide formulations,

b) be durable,

c) give splash and droplet protection,

d) be comfortable and light in weight, and

e) be affordable.

NOTE Lightweight synthetic materials have been developed specifically for the protection of operators during spraying operations.

7.3 Ponchos

7.3.1 A poncho is a one-piece garment with a hood made of impervious nonwoven material.

A poncho shall be worn when pesticide containers are being filled or when pesticides are being decanted and during the spraying of pesticides classified as danger groups II, III and IV (colour code yellow, colour code blue and colour code green respectively). A poncho is open at the sides to allow movement of air. This type of

garment has the specific benefit of providing additional protection against leaking sprayers and can be worn over work clothes or the two-piece cotton overalls.

7.3.2 A poncho shall

a) be impervious to pesticides,

b) be durable,

c) allow movement of air,

d) be comfortable, and

e) be light in weight.

7.4 Protective aprons

7.4.1 A protective apron gives additional protection against spills and splashes during the mixing and loading of pesticides. A protective apron shall be made of impervious nonwoven material. It shall cover the front of the body from the top of the chest to below the knees and shall also wrap round the sides of the body and legs. A light colour, which allows for visual identification of contamination, is preferable. Disposable aprons can be used as an alternative.

7.4.2 An apron shall be:

a) impervious to pesticides,

b) durable,

c) comfortable, and

d) affordable.

NOTE Lightweight synthetic materials have been developed specifically for the protection of operators during spraying operations.

7.5 Eye and face protection

7.5.1 A face shield shall not be worn during the application of pesticides that emit toxic vapours or low boiling- point organic solutions

7.5.2 A face shield made of clear transparent material is a comfortable form of eye and face protection. A face shield offers protection against splashes and is less likely to mist over than industrial goggles. If eye protection is needed, and a face shield is not available, a pair of safety goggles is an acceptable alternative. The material of the shield shall be impervious to a wide range of pesticide formulations.

7.5.3 The head band of the face shield shall be made of solvent-resistant foam plastic. The foam plastic shall not absorb spray droplets and shall be non-irritant to the skin.

7.5.4 The face shield shall be of height approximately 150 mm and of width approximately 300 mm in order to give full face protection. The top of the face shield shall be curved or shall be flexible to fit the face and shall be of sufficient width to keep the shield clear of the face. The shield shall be held against the head by an adjustable strap.

7.5.5 A face shield shall be:

a) transparent,

b) impervious to solvent and pesticide vapours,

c) non-misting,

d) durable,

e) light in weight, and

f) non-reflective.

7.6 Gloves

7.6.1 Immediately after use and before being removed from the hands, the gloves shall be washed with soap and water. Contaminated gloves shall not be touched with bare hands when being removed. The gloves shall be turned inside out and shall be washed again, and rinsed and allowed to dry completely before being put away.

7.6.2 Protective gloves are available in a variety of materials and designs. Gloves shall fit the hands comfortably and shall be flexible enough to grip a pesticide container and other equipment firmly. Gloves shall be long enough to cover a minimum of 90 mm above the wrist. Gloves made of nitrile rubber offer good protection against a wide range of pesticides and shall be of light colour so as to permit visual identification of contamination. PVC, neoprene and butyl rubber are suitable alternative materials. Lined gloves are not recommended, since pesticide contamination can accumulate in the lining material.

7.6.3 Disposable polyethylene gloves or plastics bags may be used as temporary hand protection, but shall be used for one operation only, and shall then be discarded.

7.6.4 Gloves shall be

a) durable,

b) comfortable,

c) flexible,

d) non-slippery, and

e) light in colour so as to permit visual identification of contamination.

7.7 Boots

7.7.1 Boots shall be washed inside as well as outside at the end of each day's work and shall then be allowed to dry before being put away.

7.7.2 Rubber boots shall be used because they give protection against the widest range of pesticides, whereas leather footwear is unsuitable because it absorbs some pesticides and leather cannot be decontaminated.

7.7.3 The rubber boots shall be at least calf-high and shall be unlined. Trousers shall be worn outside the boots to prevent any spills or splashes from entering the boots. To prevent injury when large steel drums are being handled, boots with steel toecaps shall be worn.

NOTE It is advisable boots are worn with stocks.

7.8 Head coverings

7.8.1 A lightweight cotton hat with a brim shall be worn for field work in hot climates and as protection against spray drift. During overhead spraying, a waterproof hat and cape shall be worn.

7.8.2 A hood (with a built-in respirator) to cover head, neck and shoulders for total skin protection shall be worn during the application of irritant powders.

7.9 Respirators

Respirators shall comply with the requirements of ~~SANS 10220~~.(refer to a Uganda Standard in OHS)

8 Washing facilities

8.1 Soap, clean towels and clean water shall be available near the operation area, but shall be so located as to avoid contamination by pesticides. When contamination has taken place, a safety shower (which, in the field, could consist of an elevated punctured water container) shall be within easy reach. There shall be no interchange of towels, soap or water between operators. Compressed air shall not be used to remove dust from the body.

8.2 Where possible, running water shall be used for washing. When running water is not available, each operator shall be provided with separate, clearly marked containers for washing of the body and of protective clothing and equipment.

8.3 Each operator shall wash or shower at the end of each operation or shift.

8.4 Contaminated washing water shall not be disposed of into any water source, including rivers, ground water sources and sewerage systems.

9 Requirements for household users

9.1 General

9.1.1 Cognizance shall be taken of the hazards involved in the use of pesticides as noted in clause 4.

9.1.2 Suitable protective clothing shall be worn, even if a relatively small quantity of pesticide is to be handled.

9.1.3 Only the operator(s) involved in the handling of a pesticide shall be present in the operation area.

9.2 Storage of pesticides

Pesticides and pesticide application equipment shall be protected from unauthorized access (see C.5) by being kept in a cool, dry cupboard or in a pesticide storeroom (see annex C) under lock and key and well away from foods, feeds, and food-processing and eating utensils away from the reach of children. Empty pesticide containers shall similarly be protected until they can be disposed of safely (see 9.5).

9.3 Preparation before application

9.3.1 Volume of spray mix

9.3.1.1 The size of the area or the number of plants or animals to be treated shall be determined. The instructions on the pesticide label shall be followed and just enough formulation for one single application shall be mixed.

9.3.1.2 The measuring vessel (and, if the pesticide container is empty, the container) shall be triple-rinsed (see 3.20) and the rinse liquid shall be added to the mixture before it is made up to volume.

9.3.1.3 Household users shall observe the above condition carefully to solve the problem of having to dispose of surplus spray mixture. Metered quantities of pesticide are available to solve this problem.

9.3.2 Dwellings and outbuildings

9.3.2.1 Foodstuffs, pets and other livestock shall be removed from the area to be treated.

9.3.2.2 If the pesticide intended to be used is flammable, all naked flames within the area shall be extinguished and all sources of ignition shall be switched off.

9.3.2.3 Care shall be taken to ensure that the formulation can safely be used on textiles (such as carpets and curtains) and that it shall not stain painted or varnished surfaces.

9.3.3 Gardens and greenhouses

9.3.3.1 Plants to be treated for pest infestation shall where applicable be well watered the day before treatment, since wilted plants can be susceptible to phyto toxicity.

9.3.3.2 All entrances to a greenhouse shall be kept closed to maintain the prevailing temperature and humidity.

9.4 Application of pesticides

9.4.1 Dwellings and outbuildings

9.4.1.1 All doors and windows shall be kept open to ensure adequate ventilation when indoor plants are treated with a pesticide. Starting with the plants furthest from the exit door, the pesticide shall be applied in accordance with the instructions on the label. The room shall be vacated and shall not be re-entered until the re-entry period stipulated on the label has expired.

9.4.1.2 The control of household pests shall be strictly in accordance with the instructions given on the label.

9.4.2 Gardens

The instructions given on the label shall be followed. When large trees are treated, the pesticide shall always be applied from an upwind direction. Care shall be taken not to contaminate susceptible plants when a herbicide is applied.

9.5 Disposal

9.5.1 When pesticide waste and empty pesticide containers are being disposed of, the relevant instructions appearing on the label(s) shall be followed.

9.5.2 To alleviate the problems of the disposal of pesticides, household users shall adhere to the following procedures:

a) the quantity bought shall be limited to what shall be needed per use;

b) only as much pesticide as shall be needed at one time for a specific application shall be prepared, and it shall be used strictly in accordance with the instructions on the label;

c) when a dilution of a pesticide concentrate is being prepared, the container(s) or other vessel(s) used to measure out the required quantity of the concentrate shall be well drained and then triple-rinsed with the relevant diluents, and the rinsing shall be added to the pesticide formulation before it is made up to the final volume for application; and

d) if all the formulation prepared for a single application is not used, any excess mixture of the pesticide shall be disposed of by being sprayed onto the soil between plants that have been treated with the mixture, and then by being dug into the soil.

e) pesticides shall be protected from unauthorized access (see D.6.1) by being kept in securely closed containers and stored under lock and key (see annex D). Empty containers shall be similarly protected until they can be disposed of safely and correctly.

9.5.3 Empty aerosol dispensers shall never be punctured or heated. Empty aerosol dispensers are not recyclable and shall be disposed of by landfill in a waste disposal site together with general waste.

9.5.4 Empty containers, other than aerosol dispensers, shall be triple-rinsed with water and then shattered (in the case of glass containers), punctured (in the case of plastics and metal containers), or so otherwise rendered unserviceable as to prevent re-use, and then deposited in authorised places. The rinsing shall be disposed of by being sprayed onto the soil between plants that have been treated with the pesticide, and then by being dug into the soil.

9.5.5 In the case of residents, it is advisable that they shall consult their health and local government authorities for advice on the safe disposal of pesticides.

9.5.6 Pesticides shall under no circumstances be dumped or disposed of into any sewerage system.

9.5.7 All used pesticide containers and empty pesticide containers shall be closed securely and shall be stored under lock and key until they can safely be disposed of (see 9.5.3 and 9.5.4).

9.5.8 Combustible containers shall not be burned. It shall be borne in mind that when herbicides volatilize, the resulting vapour can damage nearby crops. Herbicides and defoliants that contain chlorates can explode when heated or when brought into contact with organic materials such as wood, sawdust and paper. Where no disposal organization operates in a farmer's district, the farmer shall consult the manufacturer about the disposal of surplus pesticides. Empty pesticide containers, other than aerosol dispensers, shall be triple-rinsed with water and then shattered (in the case of glass containers), punctured (in the case of plastics and metal containers), or so otherwise rendered unserviceable as to prevent re-use before being disposed of as described in 9.5.9.

9.5.9 Livestock dipping tanks on farms shall be cleaned out by the owner or by another responsible person (see 10.2.3) from time to time, as follows:

a) the level of the dip shall be reduced as far as possible by the normal dipping of animals;

b) the remaining liquid in the dipping tank shall be removed by either being pumped or baled out over a large area of the surrounding ground (which shall be so fenced off as to keep out animals, children, etc.). Care shall be taken to ensure that dams and rivers in the vicinity are not contaminated; and

c) sludge shall be removed from the bottom of the tank and shall be deposited in a pile on the ground within a safe, fenced-off area or, where possible, ploughed into the ground.

9.5.10 Pesticide waste and empty containers should preferably be returned to the local supplier or sent to a registered disposal company. Alternatively, triple-rinsed empty pesticide containers (with the exception of plastics drums that previously contained a pesticide) can be sent to a registered reprocessing company. However, pesticide waste and empty punctured containers (see 9.5.7) may be disposed of in a waste disposal site on a farm, provided that the site is registered as a hazardous waste landfill site with the national department that deals with waste management and disposal.

9.5.11 Empty triple-rinsed pesticide containers (especially plastics containers) that have been rendered unserviceable (see 9.5.7) could be considered for processing (recycling) into other products such as building construction materials. Thermal destruction shall only be carried out in a facility authorized by the national department that deals with waste management and disposal.

9.5.12 The geology of a site intended as a waste disposal site for pesticides shall be taken into account. A farmer shall ensure that such a site is situated on ground that is relatively high and flat, or on ground that slopes gently away from any surface or subsurface water supply, and is at least 100 m, and preferably 1 000 m, away from any water source. The waste disposal site shall be identified and securely fenced off, and trespassing on the site shall be forbidden.

9.5.13 The waste disposal site shall be excavated to a depth of at least 1 m and, depending on the type of pesticide to be disposed of; lime shall be spread over the bottom of the excavation in a continuous layer of thickness approximately 10 mm. The pesticide shall be diluted to at least the minimum dosage (lowest concentration) recommended on the label, and then poured evenly or sprayed over the surface of the lime. The deposited pesticide shall immediately be covered with a layer of ash and a layer of soil or other covering material of thickness at least 450 mm.

9.5.14 An aircraft landing strip on a farm from which the aerial application of pesticides is carried out shall be made secure from approach by livestock and by persons not actively involved in the aerial application of such pesticides, and should preferably have a concrete slab with a suitable drainage system into which aircraft spraying tanks can be emptied.

10 Requirements for farmers

10.1 Storage facilities

A pesticides store on a farm shall be organized and maintained as described in either annex C or annex D, depending on the volume of pesticides to be stored.

10.2 Responsibilities

10.2.1 Farmers shall adhere to the relevant national regulations regarding occupational health and safety, and basic conditions of employment (see clause 5 and annex A).

10.2.2 All farm workers shall be aware of the hazards involved in the use of pesticides (see clause 4), especially in connection with empty pesticide containers.

10.2.3 A supervisor shall be appointed who has adequate knowledge of, and experience in, the application and hazards of pesticides (see 5.2.1.3).

10.2.4 The supervisor and at least one other farm worker shall be trained in the application of basic first aid (see 5.2.2 and annex B).

10.2.5 If work involves regular exposure to pesticides, only persons who have been medically examined and found to be fit shall be employed (see also 5.2.1.4).

10.2.6 The exposure limits as laid down in the relevant national regulations (see 5.2.1.1 and annex A) shall not be exceeded.

10.3 Health precautions

10.3.1 Farm workers who are engaged in the handling of pesticides on a regular basis shall undergo a medical examination at intervals as stipulated in 5.2.4.2.

10.3.2 If a farm worker is involved in an incident or becomes ill, the medical practitioner in attendance shall be provided with the:

a) farm worker's work-exposure record card (see 10.4),

b) label, or at least the name of the active ingredient, of the pesticide involved, and

c) MSDS of the pesticide, if available.

10.3.3 A farm worker who, on medical grounds, has been advised to abstain from working with a particular type of pesticide shall not be permitted to work with another type of pesticide unless prior approval (endorsed on the farm worker's work-exposure record card) has been obtained from the medical practitioner (see also 5.2.4.4).

10.4 Work-exposure record card

Subject to any restriction or further requirements in terms of the relevant national regulations and local regulatory requirements (see 5.2.3 and annex A), a work-exposure record card shall be kept for each farm worker engaged in the handling of pesticides.

10.5 Preparation before application

10.5.1 Warnings

10.5.1.1 Timely warnings shall be issued to the following government department or persons (or both) about the nature and date of a proposed pesticide application:

a) the national department(s) that deal(s) with water and environmental affairs (see foreword) if agricultural remedies are to be applied to pests whose habitat is water-related, for example water hyacinth, and birds nesting along the perimeters of dams;

b) farm workers not involved in the handling of pesticides, ordering them to keep away from the operation areas; and

c) all persons on the farm and on neighbouring farms, ordering them to refrain from collecting and consuming poisoned birds and other animals.

10.5.1.2 If severely toxic pesticides are to be applied, warning notices shall be placed on the gates that give access to the fields where treatment is intended. The warning notices shall be in one of the official languages and in at least one other language indigenous to the region. The height of the letters shall be at least 75 mm.

10.5.2 Spray mix

10.5.2.1 The size of the area or the number of animals to be treated shall be determined and the instructions on the pesticide label shall be followed. Just enough formulation for a single application shall be mixed. The measuring vessel shall be triple-rinsed (see 3.20) and the rinse liquid shall be added to the mixture before it is made up to volume.

10.5.2.2 Extreme care shall be taken during mixing operations and when a spray tank is filled to prevent contamination of persons and the environment. The mixing and filling area shall be well away from any water sources, and entry to the area shall be restricted. The floor shall be of non-porous material and shall be bunded.

10.5.2.3 Any spillage in the area described in 10.5.2.2 shall be collected and disposed of in accordance with 10.7.

10.5.2.4 When mixing takes place in the field, any spillage on the soil shall be collected and, together with the contaminated soil, be disposed of in accordance with 10.7

10.5.3 Animals

Unless treatment of animals, or treatment of permanently occupied animal housing, is intended, all animals shall be kept away from the operation areas during mixing and application operations, and afterwards for the period stipulated on the label.

10.5.4 Soil fumigation

10.5.4.1 When soil fumigation with a gaseous fumigant is intended, the number of gas proof sheets needed, and the mass of fumigant required for the type of soil to be treated, shall be estimated.

NOTE Opaque or coloured sheets retain heat and expand when their temperature increases, thus becoming more permeable to gas and more vulnerable to wind damage.

10.5.5 Buildings

10.5.5.1 All foods, feeds and livestock shall be removed from the building. Plastics sheeting and plastics-backed adhesive tape or masking tape shall be used to cover and seal all food-processing utensils, stock remedies, animal-handling apparatus, saddlery, etc. that cannot be removed.

10.5.5.2 If the pesticide intended to be used is flammable, all naked flames within the area shall be extinguished and all sources of ignition shall be switched off.

10.6 Application of pesticides

10.6.1 Application on crops and animals

10.6.1.1 Manually or mechanically operated equipment shall be used to apply a pesticide in accordance with the instructions on the label.

10.6.1.2 Drift of pesticide spray or dust (or both) onto people, animals, adjacent land, public roads, footpaths, water supplies and crops shall be avoided, particularly when harvesting is taking place. If herbicides are applied, the drift of herbicide spray or dust (or both) onto susceptible crops shall be avoided. Spraying or dusting operations (or both) shall be suspended under adverse weather conditions to prevent the danger of contamination. The instructions on the label concerning wind speed shall be followed.

10.6.1.3 Harvesting or grazing immediately after application of a pesticide shall not be permitted. The pre-harvest and re-grazing period stipulated on the label shall be strictly adhered to, and no harmful pesticide residues shall be present on crops when harvesting or grazing is resumed.

10.6.2 Buildings

10.6.2.1 If a pesticide is applied as a space spray, all windows and doors, except the exit door, shall be closed. After completion, the area shall be vacated immediately, the exit door closed and the area kept closed for the period stipulated on the label. At the end of this period, all windows and doors shall be opened and, if applicable, fans shall be switched on. The area shall not be deemed safe until the ventilation period stipulated on the label has expired.

10.6.2.2 If the pesticide is applied as a dust or a residual spray, all windows and doors shall be opened to ensure adequate ventilation. The dust or residual spray shall be applied in accordance with the instructions given on the label, starting at the point furthest from the exit door. The area shall be vacated as soon as the application has been completed, and shall not be re-entered until the ventilation period stipulated on the label has expired.

10.6.2.3 A residual spray can be added to the irrigation system of a greenhouse and the mixture released through the nozzles of the system until the plants are well covered with the spray mixture. Alternatively, manually or mechanically operated equipment can be used to apply the residual spray in accordance with the instructions on the label. Space sprays, smoke, mists and fogs shall be applied in accordance with the instructions on the label.

10.6.2.4 Bait shall be placed in such a position as to be inaccessible to children and animals. Bait shall be replenished when necessary, and shall be removed when all pest activity has ceased.

10.6.3 Outdoor areas

10.6.3.1 Patio and other outdoor surfaces with which people might come into contact shall only be treated if it is stated on the label that the pesticide can safely be used for this purpose.

10.6.3.2 Bait shall be placed in such a position as to be inaccessible to children and animals. Bait shall be replenished when necessary, and shall be removed when all pest activity has ceased.

10 Requirements for pest control operators

10.1 General

10.1.1 A pest control operator shall ensure that workers are aware of the hazards involved in the use of pesticides (see clause 4) and of the provisions regarding protective clothing and equipment (see clause 7).

10.1.2 If a severely toxic pesticide is to be applied, a warning notice together with the toxic hazard class diamond (see table D.1), shall be placed at the entrance of the site to be treated or on gates or doors that give access to the operation area. The warning notices shall be in one of the official languages and in at least one other language indigenous to the region. The height of the letters shall be at least 75 mm. The dimensions of the toxic hazard class diamond shall be at least 250 mm × 250 mm.

10.1.3 A pest control operator shall be acquainted with the handling and application of pesticides in accordance with US 863. A pest control operator shall be fully aware of the hazards involved in the use of pesticides, as noted in clause 4 and of further information given in US1792-1 regarding the toxicity of pesticides, and the first-aid treatment in cases of suspected poisoning (see annex B).

10.2 Storage facilities

The storage facilities shall be organized and maintained in accordance with the requirements given in either annex C or annex D, depending on the volume of pesticides to be stored.

10.3 Preparation before application

10.3.1 Before treating indoor areas, for example offices, homes and catering establishments, the pest control operator shall provide the occupant(s) with a written list of the materials and articles that have to be removed before treatment can start, for example

a) all food not sealed in metal containers,

b) eating utensils and movable food-processing utensils,

c) pets, including fish in aquariums,

d) pot plants, if the pesticide has phyto toxic properties,

e) all clothes, if cupboards are to be treated,

f) any loose carpets, and

g) any toys and cribs.

10.3.2 The pest control operator shall, by personal inspection, ensure that the operation areas have been vacated and that, where relevant, all fires and naked flames within the operation area have been extinguished and that oil, gas and electrical supplies have been turned off.

10.3.3 Plastics-backed adhesive tape or masking tape shall be used to seal food freezers and refrigerators. Plastics sheeting shall be used to cover all items that cannot be removed and all working surfaces, and the sheeting shall be sealed with plastics-backed adhesive tape or masking tape.

10.3.4 The pest control operator shall ensure that the pesticide formulation can safely be used on textiles (such as carpets and curtains) and that it will not stain painted or varnished surfaces.

10.3.5 The pest control operator shall determine the size of the area or space to be treated and, by following the instructions on the label, shall prepare just enough pesticide for a single application. The measuring vessel shall be triple-rinsed (see 3.20) and the rinse liquid shall be added to the mixture before it is made up to volume.

10.3.6 If a herbicide is to be applied, the pest control operator shall take cognizance of other plants growing in the area to be treated and that might be susceptible to that particular herbicide.

10.4 Application of pesticides

10.4.1 Buildings

10.4.1.1 Space sprays

All windows and doors, except the exit door, shall be closed. Cupboard doors and drawers shall be opened and the formulation shall be applied in accordance with the instructions on the label. After completion of the application of the pesticide, the room shall be vacated immediately, the exit door closed and the room kept closed for the period stipulated on the label. At the end of this period, all doors and windows shall be opened and, if applicable, fans shall be switched on. The room shall not be deemed safe until the stipulated ventilation period has expired.

10.4.1.2 Dusts and residual sprays

All doors and windows shall be opened to ensure adequate ventilation. The spray or dust shall be applied in accordance with the instructions on the label, starting at the point furthest from the exit door. The room or area shall be vacated as soon as the application has been completed and the treated room shall not be re-entered until the stipulated ventilation period has expired. If human dwellings are being treated, a strip of about 1 m wide on walls where small children or elderly persons could touch treated surfaces shall remain untreated in frequently used areas, for example passages.

10.4.1.3 Bait

Bait shall be placed in such positions that it is inaccessible to children and animals. Bait can be replenished when necessary, and shall be removed when all pest activity has ceased.

10.4.1.4 Fumigants

Fumigants shall be applied in accordance with US 863.

10.4.2 Outdoor areas

10.4.2.1 General

10.4.2.1.1 Manually or mechanically operated equipment can be used to apply a pesticide (to a point near run-off) in the form of a coarse spray against surfaces.

10.4.2.1.2 Drift of pesticide spray or dust (or both) onto people, animals, driveways, susceptible plants and water supplies shall be avoided by the suspension of operations in windy weather if there is a danger of contamination. Humans and animals shall not be allowed into the operation area until the surfaces have dried or the dust has settled.

10.4.2.2 Patios and other outdoor floor surfaces

Patios and other outdoor floor surfaces shall only be treated when it is stated on the label that the pesticide can safely be used for this purpose.

10.4.2.3 Herbicides

Herbicides shall be applied in accordance with the instructions on the label, and care shall be taken not to contaminate other susceptible plants.

10.4.2.4 Soil fumigants

Soil fumigants shall be applied in accordance with US 863.

10.4.2.5 Bait

Bait shall be placed in such a position that it is inaccessible to children and animals. Bait can be replenished when necessary, and shall be removed when all pest activity has ceased.

10.5 Disposal

10.5.1 To minimize the problems of disposal, pest control operators shall follow the following procedures:

a) only as much pesticide as will be needed at one time for a specific application shall be prepared, and it shall be used strictly in accordance with the instructions on the label;

b) when the entire contents of a container are to be used, the container shall be emptied until the flow has slowed to a drip, and the container and the measuring vessel shall then be triple-rinsed with the relevant diluent and the rinsings shall be added to the pesticide formulation before it is made up to the final volume for application; and

c) access to full or empty waste containers, unless authorized by the pest control operator, shall be prohibited until such time as they can be disposed of. All such containers shall be kept securely closed and stored under lock and key, and records of the containers shall be kept.

10.5.2 Pesticide waste and empty containers should preferably be returned to the local supplier or to a registered disposal company. Alternatively, triple-rinsed empty pesticide containers (with the exception of plastics drums that previously contained a pesticide) can be sent to a registered reprocessing company.

Before empty pesticide containers (other than aerosol dispensers) are disposed of, they shall be triple-rinsed with water and then shattered (in the case of glass containers), punctured (in the case of plastics and metal containers), or so otherwise rendered unserviceable as to prevent re-use.

10.5.3 Pesticide waste or empty punctured containers (or both) shall only be disposed of at a site registered as a hazardous waste landfill site with the national department that deals with waste management and disposal.

10.5.4 Empty aerosol dispensers shall never be punctured or heated. Empty aerosol dispensers are not recyclable and may be disposed of by landfill in a waste disposal site together with general waste.

10.5.5 Empty triple-rinsed pesticide containers (especially plastics containers) that have been rendered unserviceable (see 11.5.2) could be considered for processing (recycling) into other products such as building construction materials. Thermal destruction shall only be carried out in a facility authorized by the national department that deals with waste management and disposal.

11 Requirements for manufacturers, formulators and packers of pesticides

11.1 General

11.1.1 The construction of a factory shall be such that it complies with the national building regulations and statutory provisions. In addition, the floors shall be bunded or constructed with a slope, to facilitate drainage into a reservoir in the event of spillage or of sprinklers being activated during a fire.

11.1.2 A reservoir shall be installed and maintained to receive all factory effluent. The contents of the reservoir shall be purified

a) to the quality requirements of the local authority if the contents are to be discharged into the sewer, or

b) to the quality requirements of the relevant national regulations and statutory provisions, and any provincial or local regulatory requirements (see annex A) if the contents are to be discharged into storm-water drains or into any other stream.

11.1.3 Manufacturers, formulators and packers shall attend regular awareness programmes about the hazards involved in the use of pesticides, and about the health and safety requirements for the handling of pesticides. All operators shall attend regular training programmes and shall abide by the relevant national regulations and statutory provisions, and any provincial or local regulatory requirements (see clause 5 and annex A).

11.1.4 Manufacturers, formulators and packers shall provide operators with adequate protective clothing and equipment (see clause 7), and shall adhere to all the relevant national, regional and local regulations (see clause 5 and annex A) regarding the health of workers exposed to pesticides.

11.2 Washing facilities

11.2.1 Adequate washing facilities shall be installed and maintained for the washing and drying of protective clothing. The washing facilities shall be readily accessible, and shall be located in an area where the facility will not become contaminated.

NOTE A water temperature of 65 °C, with the addition of an appropriate detergent, and a triple cycle of wash and rinse is suitable for the removal of most pesticides.

11.2.2 All washing and rinsing water shall be directed to the reservoir (see 12.1.2).

11.3 Storage facilities

11.3.1 The distribution store shall comply with the requirements given in annex E.

11.3.2 Separate storage areas shall be set up for the different types of pesticides manufactured, formulated or packed. An inventory shall be kept of all stored pesticides. The inventory shall be kept away from the storage area and shall be available at all times for inspection.

11.3.3 Hazardous raw materials and formulations on pallets shall be kept in a separate room or a separate area of the warehouse, and shall be secured against unauthorized entry (see E.6.1.1) and against burglary.

11.4 Warning notices and symbolic safety signs

Suitable symbolic safety signs in accordance with US ISO 7010 and warning notices shall be posted in and around the areas where pesticides are kept or handled. The height of the letters shall be at least 75 mm. The dimensions of the toxic hazard class diamond shall be at least 250 mm × 250 mm (see table D.1).

11.5 Spillages and leaks

11.5.1 All containers shall be inspected regularly for leaks. When a container is damaged, the pesticide shall be transferred to a suitable, clean, compatible container and the new container shall be clearly labelled.

11.5.2 Vermiculite, sand or any other suitable inorganic material that can absorb spillage or leakage shall be available and easily accessible, together with suitable empty containers, shovels, squeegees and brooms.

11.6 Fire precautions

The requirements of clause 14 and annex F shall be complied with.

12 Requirements for pesticide distributors and any other traders in pesticides

12.1 General

12.1.1 Pesticide distributors and any other traders in pesticides shall comply with the relevant national regulations and statutory provisions, and any provincial or local regulatory requirements (see clause 5 and annex A).

12.1.2 The management of a pesticide distributing company and the management of any other establishment trading in pesticides shall offer regular awareness programmes about the hazards involved in the use of pesticides, and about the health and safety requirements for the handling of pesticides. All operators shall attend regular training programmes, and shall abide by the relevant national regulations and statutory provisions, and any provincial or local regulatory requirements (see clause 5 and annex A).

12.1.3 If pesticides constitute a large part of the company's trade, the locality of the nearest hospital or medical consulting rooms and the hours of attendance, and the locality and telephone numbers of the local emergency services shall be established.

12.2 Storage and display of pesticides

12.2.1 A separate pesticide distribution store shall be organized in accordance with annex E.

However, the storage requirements of annex G apply if the quantities of pesticides to be stored exceed the maximum quantities given in table E.1.

12.2.2 Pesticides that are displayed for purposes of sale shall be well removed from foodstuffs, feeds, clothing, medicines, cosmetics and toiletries, and the pesticides shall be so placed that they are out of the reach of children in trolleys. Additionally, pesticides classified as danger group I(a) and danger group I(b) (colour code red) in terms of US 1792-1 shall be kept in a locked cupboard or other locked area.

12.3 Disposal of pesticides

12.3.1 All materials that are contaminated with pesticides, all unwanted pesticides and all empty pesticide containers (that have been triple-rinsed – see 3.17) should preferably be sent to a registered disposal company for disposal at a site registered as a hazardous waste landfill site with the national department that deals with waste management and disposal.

Alternatively, triple-rinsed empty pesticide containers (with the exception of plastics drums that previously contained a pesticide) can be sent to a registered reprocessing company. Before empty pesticide containers (other than aerosol dispensers) are disposed of, they shall be triple-rinsed with water and then shattered (in the case of glass containers), punctured (in the case of plastics and metal containers), or so otherwise rendered unserviceable as to prevent re-use.

12.3.2 Empty triple-rinsed pesticide containers (especially plastics containers) that have been rendered unserviceable could be considered for processing (recycling) into other products such as building construction materials. Thermal destruction shall only be carried out in a facility authorized by the national department that deals with waste management and disposal.

12.4 Fire precautions

The requirements of clause 13 and annex F shall be complied with.

13 Fire precautions and action in the event of fire

13.1 To facilitate effective action in the event of fire, the procedures for fire drills shall be planned in collaboration with the local fire authority and in accordance with the relevant national regulations and statutory provisions, and any provincial or local regulatory requirements (see annex A).

13.2 Suitable fire extinguishers, in accordance with annex F, shall be available and shall be easily accessible. All relevant national regulations and statutory provisions

, and any provincial or local regulatory requirements (see annex A) in respect of fire extinguishers shall be complied with

13.3 In the event of fire, the procedures given in annex F shall be followed. In addition, the relevant national regulations and statutory provisions, and any provincial or local regulatory requirements in respect of contaminated run-off shall be complied with.

Annex A
(Informative)

Relevant Ugandan regulations and statutory provisions

A.1 Acts

1. Employment Act, 2006 (Act No. 11(3) of 2006)
2. Environment Conservation Act
3. The Building Control Act, 2013
4. The Traffic and Road Safety Act, 1998
5. The Water Act, Cap. 152
6. The Occupational Safety and Health Act, 2006
7. The Control of Agricultural Chemicals Act
8. The National Environment (Management of Ozone Depleting Substances and Products) Regulations,2001(S.1.No.63 of 2001)
9. National Environment (Waste Management) Regulations,1999.
10. Ratification of Treaties Act 1998
11. The Water(Water Discharge) Regulations,No.32/1998
12. The Environmental Impact Assessment Regulation,S.1.No.13/1998

A.2 Other publications

1. Minimum requirements for waste disposal by landfill
2. Minimum requirements for water monitoring at waste management facilities

Annex B
(normative)

First aid

B.1 General

B.1.1 The simple mnemonic ABC: A (airway) – B (breathing) – C (circulation) will help to keep the majority of poison victims alive until medical help arrives.

B.1.2 Speed is essential in the treatment of any contamination incident, since contamination can result in poisoning, especially when the victim has been exposed to a highly toxic pesticide.

B.1.3 Symptoms of poisoning can either be localized, for example irritation of the throat, nose, skin or eyes, or be more general. The appropriate first-aid measures depend to some extent upon the route by which the pesticide has entered the body (see B.2.2).

B.2 Requirements for untrained persons

B.2.1 Immediate action

B.2.1.1 Move the patient away from the contaminated area.

B.2.1.2 Keep the patient calm and comfortable and immediately either summon a medical practitioner or take the poison victim to a medical practitioner. If the patient can walk, allow him to do so only with assistance.

B.2.1.3 If the patient is unconscious, turn him onto his right side with his right leg straight, his left leg drawn up and his head so bent back that the respiratory tract is kept clear; loosen the clothing round the neck, chest and abdomen, and keep the patient quiet and lightly covered.

B.2.1.4 Follow the applicable procedures given in B.2.2.1.2, B.2.2.2.2, B.2.2.3.2 and B.2.2.4.2.

B.2.2 Routes of poisoning and action to be taken

B.2.2.1 Inhalation

B.2.2.1.1 Symptoms

Symptoms of exposure by inhalation might include headache, dizziness, nausea, sore throat, anxiety, and tightness of the chest.

B.2.2.1.2 Action

Move the patient to an area where there is fresh air, and loosen the clothing round the patient's throat and neck. Seek medical attention immediately, and show the pesticide label to the medical practitioner if possible.

B.2.2.2 Ingestion

B.2.2.2.1 Symptoms

Although accidental ingestion of a pesticide seldom happens, it might occur owing to contamination of eating utensils, food or drinking water. Ingestion of a pesticide often causes nausea, vomiting, abdominal pains and diarrhoea.

B.2.2.2.2 Action

B.2.2.2.2.1 Do not give the patient anything to drink, unless this is specified on the pesticide label.

B.2.2.2.2.2 Do not induce vomiting, unless specified on the label.

B.2.2.2.2.3 If the patient vomits spontaneously, clean out his mouth and throat. Retain the vomit for analysis.

B.2.2.2.2.4 Seek medical attention immediately, and show the pesticide label to the medical practitioner if possible.

B.2.2.3 Skin contact

B.2.2.3.1 Symptoms

Although many pesticides only irritate the skin, some can penetrate intact skin rapidly, even if no skin irritation is experienced.

Many pesticides are absorbed through the skin, particularly on the scalp, at the back of the neck, on the soles of the feet and other exposed skin areas. Symptoms of poisoning include headache, nausea, tiredness, irritability; anxiety and abnormal behaviour. Symptoms are often delayed.

B.2.2.3.2 Action

B.2.2.3.2.1 If a pesticide comes into contact with an operator's skin:

a) remove the contaminated clothing immediately; and

b) rinse the affected area with plenty of clean water and seek medical attention. A person assisting the patient by rinsing the affected area shall wear clean chemical-resistant gloves.

B.2.2.3.2.2 When an operator becomes grossly contaminated, even if operations are incomplete:

a) remove the patient from the operation area;

b) remove protective clothing and protective equipment immediately;

c) wash the affected area with plenty of clean water;

d) put on clean clothes; and

e) seek medical attention immediately, and show the pesticide label to the medical practitioner if possible.

B.2.2.4 Eye contact

B.2.2.4.1 Symptoms

The patient might not experience severe discomfort, but first aid shall nevertheless be carried out immediately.

B.2.2.4.2 Action

Rinse the eyes with plenty of clean water for at least 10 min and seek medical attention. Show the pesticide label to the medical practitioner if possible.

B.3 Requirements for trained persons

B.3.1 Follow the instructions given in B.2. In addition, advise the medical practitioner if it is suspected that the pesticide ingested might contain petroleum distillates or other hydro carbon solvents.

B.3.2 If the patient experiences difficulty in breathing, administer oxygen until medical help arrives. Apply artificial respiration if breathing has stopped. If there is concern about possible transfer of communicable diseases through mouth-to-mouth resuscitation, a disposable protective mouthpiece can be used.

B.3.3 Apply cardiopulmonary resuscitation if the heartbeat has stopped.

B.3.4 When poisoning is caused by phosphine, methyl bromide or hydrogen cyanide, mouth-to-mouth resuscitation can be fatal. Use a manual respiratory resuscitating device instead.

B.3.5 On arrival of the medical practitioner:

a) show him the pesticide label; or

b) provide the MSDS.

When relevant, submit the work-exposure record card of the patient to the medical practitioner without delay.

B.4 Requirements for medical practitioners and nursing staff

B.4.1 General

An operator could take ill from natural causes while handling pesticides, and wrong treatment could make the operator's condition worse. It is therefore important to establish whether a pesticide was actually involved before treatment is given. Contact the supplier of the pesticide for information additional to that given in the MSDS or on the pesticide label, if necessary. As soon as the nature of the poison and the route of poisoning (see B.2.2) have been confirmed, carry out the appropriate emergency treatment (which might include the administration of an antidote).

B.4.2 Gastric lavage

If a very toxic pesticide is involved, gastric lavage may be used to empty the stomach, provided that it can be carried out within 4 h of ingestion of the poison. Gastric lavage is, however, contra-indicated if a pesticide that contains hydrocarbon solvents or that has corrosive properties has been ingested. Carry out symptomatic and supportive treatment instead.

B.4.3 Induction of vomiting

The induction of vomiting is not recommended. However, if the induction of vomiting is indicated on the pesticide label, or if the medical practitioner deems such induction necessary, ensure that the patient is fully conscious. Administer 10 mL to 15 mL of ipecacuanha tincture (BP), followed by a glass of cold water to facilitate emesis. If necessary, follow this treatment with a similar dose after 20 min. After emesis, administer four to five tablets (or one tablespoon) of activated charcoal in a glass of water, followed by a suitable laxative. Follow this with symptomatic and supportive treatment.

B.5 First-aid kit

B.5.1 A first-aid kit shall contain at least the following items:

a) wound cleaner or antiseptic (100 ml);

b) swabs for cleaning wounds;

c) cotton wool for padding (100 g);

d) sterile gauze swabs (minimum quantity of 10);

e) 1 pair of forceps (for splinters);

f) 1 pair of scissors (minimum size 100 mm);

g) 1 card of safety pins;

h) bandages:

i) 4 triangular bandages;

ii) 4 roller bandages (75 mm × 5 m);

iii) 4 roller bandages (100 mm × 5 m); and

iv) 1 roll of elastic adhesive bandage (25 mm × 3 m);

i) adhesive strips:

i) 1 roll of non-allergenic adhesive strip (25 mm × 3 m); and

ii) 1 packet of adhesive dressing strips(minimum quantity of 10 assorted sizes);

j) first-aid dressings:

i) 4 first-aid dressings (75 mm × 100 mm); and

ii) 4 first-aid dressings (150 mm × 200 mm);

k) 2 straight splints;

l) 2 pairs of large and 2 pairs of medium disposable latex gloves;

m) 2 cardiopulmonary resuscitation (CPR) mouth-pieces or similar devices; and

n) an eyewash bottle containing distilled water or rinse solution.

B.5.2 The following items shall be available at the medical station, for use by nursing staff and by medical practitioners:

a) pecacuanha tincture (BP);

b) about 200 g of activated charcoal in powder form or tablet form; and

c) any special equipment, antidotes, etc., that might be required in view of the specific chemicals to be applied.

B.5.3 Antidotes shall be kept separate from other items.

Annex C
(normative)

The storage of pesticides in a storeroom

C.1 General

This annex gives requirements for the storage of small volumes (see table C.1) of pesticides in storerooms.

C.2 Local authority approval

A pesticide storeroom shall comply with the regulations and statutory provisions of the relevant departments (local fire authority, public health, sewerage, building inspectorate, etc.), and a certificate of occupancy shall be issued by the local authority in accordance with the national building regulations.

C.3 Construction

C.3.1 General

The storeroom shall be constructed of non-combustible material that is impervious to the pesticide(s) being stored. The floor shall be of concrete that is smooth but not slippery (even when wet). Contaminated firefighting water shall be contained by means such as a surrounding sill, kerb or bund wall. The doorway shall be bunded to a height of 200 mm and this, together with the wall-to-floor joints, shall be watertight. The purpose of the bund is to contain spills or firefighting water that could cause damage to the environment, and to prevent water (for example flood run-off) from entering the storeroom. Windows and doors shall be secured to prevent forced entry.

C.3.2 Ventilation

The storeroom shall be so designed and constructed as to ensure that pesticide fumes are effectively ventilated in all parts of the storeroom, whether naturally or mechanically. The fumes shall be released to the open air in such a way that they are not likely to come into contact with sources of ignition that might ignite them.

C.3.3 Shelves

C.3.3.1 The storeroom shall be equipped with racks or shelves that are impervious and chemically resistant to the stored chemicals. Liquid products shall be stored on the lower shelves. The powder and granular formulations shall be stored on shelves above the liquid products. This is to provide for minimum damage in the event of accidental leakage of liquid during storage.

C.3.3.2 Pesticides in fibre board boxes, paper bags and fibre board drums shall not be stored directly on the floor, nor shall they be stacked against a wall. Cement floors tend to sweat and damage could be caused to boxes, drums and paper bags. Plastics and metal drums of capacity 20 L or more shall not be stacked more than two tiers high.

NOTE Non-combustible trays on hardwood shelves may be used.

C.3.4 Lighting

C.3.4.1 When a storeroom is used only during daytime, and natural lighting provides a sufficient level of illumination to ensure compliance with the national building regulations (see foreword), artificial lighting need not be installed.

C.3.4.2 Storerooms and material handling areas shall be illuminated to 150 lx, and issuing counters shall be illuminated to 200 lx.

C.4 Electrical equipment

Electrical equipment shall comply with the requirements of D.5.

C.5 Security

Only the supervisor and personnel appointed by the supervisor to be responsible for the storeroom shall have access to the keys and be allowed into the storeroom. All keys shall be labelled.

C.6 Warning notices and symbolic safety signs

C.6.1 At the entrance to the storeroom the warning "Storage of pesticides – Unauthorized entry prohibited" shall be displayed in red letters against a white background. The warning notice shall be in one of the official languages and in at least one other language indigenous to the region. The height of the letters shall be at least 75 mm.

C.6.2 Symbolic safety signs in accordance with the requirements of US ISO 7010 shall be displayed at the entrance to the storeroom, and inside the storeroom, to denote the safety-related features of the storeroom, for example

a) no smoking,

b) no naked flames, and

c) no eating or drinking.

C.6.3 The dimensions of the symbolic safety signs shall be at least 290 mm × 290 mm. All workers shall undergo training in the meaning of the signs, warning notices, and labels on pesticide containers.

C.7 Fire protection and emergency planning

C.7.1 Portable fire extinguishers, as specified in US ISO 7159:2009 and US ISO 11602-2:2000 as applicable, shall be provided, unless the local fire authority is of the opinion that a larger number of fire extinguishers need to be installed.

C.7.2 A fire hose shall be mounted on the outside of the storeroom and shall be connected to a water supply.

C.7.3 A sprinkler system shall be considered, but need not be installed if the storeroom is of capacity 9 m^3 or larger and is equipped with suitable manual firefighting equipment.

C.7.4 The emergency telephone numbers of the nearest poison centre, medical practitioner, hospital and ambulance service shall be clearly displayed at the entrance and inside the storeroom. The person(s) responsible for the storeroom shall have access to these numbers and a telephone in case of an emergency.

C.8 Personal protective clothing and equipment

C.8.1 All operators shall be aware of the hazards involved in the use of pesticides and of the importance of the wearing of personal protective clothing.

C.8.2 Instructions on the MSDS of the pesticide or on the pesticide label shall be followed regarding the correct personal protective clothing and equipment to be worn. All operators shall clearly understand that, even though protective clothing and equipment are used, great care still has to be taken (see clause 4 and clause 7).

C.8.3 Only persons who have been medically examined and found fit shall be employed (see 5.2.4) in a job that involves regular exposure to pesticides.

C.9 First aid

C.9.1 At least one worker shall be trained in basic first aid (see annex B). Sufficient information on the relevant first-aid procedures for the pesticides in the storeroom shall be available in a prominent place.

C.9.2 Soap, a clean towel and running water shall be available near the operation area, but so located as to avoid contamination by pesticides.

C.10 Record keeping

C.10.1 The supervisor or (a) person(s) appointed by the supervisor (see C.5) shall keep a written or electronic record for each product received, dispatched and used.

C.10.2 On receipt of a pesticide from a supplier, at least the following information shall be recorded:

a) product name;

b) batch number;

c) name and address of supplier;

d) quantity and date of receipt; and

e) name of the responsible person who received the product (see C.5 and C.10.1).

C.10.3 Records shall be kept of all the products that are used and of the balance of products in the storeroom.

C.10.4 The records shall be kept in a safe place away from the storeroom, and shall be available at all times for inspection by national, provincial or local authorities, as applicable.

C.11 Emergency training

C.11.1 All operators shall be trained in the use of the different types of fire extinguishers on site and shall practise their duties as set out under the emergency plan.

C.11.2 The emergency training shall include:

a) initiation of the alarm,

b) correct use of the firefighting equipment,

c) evacuation procedures,

d) roll calls, and,

e) fire drills.

Annex D
(normative)

The storage of pesticides on farms

D.1 General

This annex gives requirements for the management practices relating to the storage of pesticides intended for immediate or seasonal use (or both) on a farm and not for resale.

D.2 Local authority approval

Applications shall be made to the local authority for permission to erect a pesticide store on a farm.

In such a case, the necessary permission shall be obtained from all relevant departments (local fire authority, public health, sewerage, building inspectorate, etc.), and a certificate of occupancy shall be issued by the local authority in accordance with the national building regulations.

D.3 Site location

D.3.1 The site shall at least be above the 50 year flood line, but preferably above the 100 year flood line.

D.3.2 The site shall be out of reach of rock falls, falling trees and veld fires.

D.3.3 The store shall be a separate building and shall be at least 10 m away from any dwelling or livestock buildings, or from where fodder, feeds, fuel or other flammable materials are stored. A minimum of 5 m between the store and other buildings is recommended. If part of a complex, the store shall be totally sealed off from the rest of the complex. There should be no free movement of air between the storage area and the rest of the complex.

D.3.4 The possible pollution risk from spilt chemicals shall be taken into account when the location of the store is being considered. Furthermore, the site chosen shall be well away from rivers, dams, boreholes and areas likely to be flooded. The direction of water flow (surface drainage) shall be taken into account in case of fire or flooding, because crops, pastures and water sources could be contaminated. The store shall be situated where it can be supervised.

D.3.5 When a store is being planned, the ease of access for delivery or dispatch shall be borne in mind. The possibility of a fire (many pesticides are highly flammable) and the need to be able to approach the building from all sides shall also be taken into consideration.

D.4 Construction

D.4.1 General

Load-bearing construction elements, for example walls, floors and doors, shall be made of non-combustible materials that are impervious to the pesticide(s) to be stored. It is recommended that load-bearing roof components be made of fire-retardant timber.

D.4.2 Frame

The frame of the store shall be of concrete or steel. A steel frame shall be fire protected to give the required stability.

D.4.3 Floors and spillage containment

D.4.3.1 The floor shall be of concrete and shall be of sufficient load-bearing capacity to withstand the weight of stock and racks. The floor shall be smooth but not slippery (even when wet), free from cracks to facilitate cleaning, and so designed as to contain leakage and contaminated firefighting water by means such as a surrounding sill, kerb or bund wall. The doorway shall be bunded to a height of 200 mm and this, together with wall-to-floor joints, shall be watertight. The purpose of the bund is to contain spills or firefighting water that could cause damage to the environment, and to prevent water (for example flood run-off) from entering the store.

D.4.3.2 In the event of a fire, the run-off water shall be prevented from leaving the site by the construction of a dyke ahead of the spill for later disposal in accordance with the relevant national regulations and statutory provisions, and any provincial or local regulatory requirements (see annex A).

D.4.4 Walls The walls shall be of brick or concrete

D.4.5 Roof

The roof shall be leak-free, and shall be insulated with non-combustible material (such as mineral wool or glass fibre) so as to maintain the temperature of the store at a reasonable level. Vents in the roof will allow for the escape of hot air during the summer months.

D.4.6 Doors

D.4.6.1 Steel doors are preferable to wooden doors. The doors shall have security gates to reduce the risk of forced entry. Doors shall be raised 200 mm to accommodate the bunding (see D.4.3).

D.4.6.2 The exit door(s) of the store shall open to the outside and shall have (a) lock(s) and key(s) as approved by the local fire authority. The exit door(s) shall at all times be capable of being opened easily from the inside without the use of (a) key(s).

D.4.7 Windows

D.4.7.1 Windows shall allow enough daylight into the store for product labels to be read. Where natural light is insufficient, it shall be supplemented with artificial lighting. All windows shall be weatherproof and burglar-barred, and should preferably be above head height ("out of sight out of mind") for security reasons.

D.4.7.2 The window frames shall be manufactured of steel and shall:

a) be fitted with wire glass of minimum thickness of 8 mm, and
b) have window panels of maximum size of 450 mm × 450 mm.

D.4.7.3 No windows shall be capable of being opened.

D.4.8 Shelves

The store shall be equipped with racks or shelves that are impervious and chemically resistant to the stored chemicals. Large bags, boxes and drums can be stored on pallets (see also D.7.6).

NOTE Non-combustible trays on hardwood shelves may be used.

D.4.9 Ventilation

D.4.9.1 The store shall be so designed and constructed as to ensure that the pesticide fumes are effectively ventilated in all parts of the store, whether naturally or mechanically. The fumes shall be released to the open air in such a way that they are not likely to come into contact with sources of ignition that might ignite them.

D.4.9.2 Natural ventilation of the store can be achieved by the installation of non-combustible airbricks of size at least 140 mm × 215 mm and that are provided with non-corrosive gauze wire of nominal opening diameter at least 0,5 mm. The airbricks shall be:

a) provided in at least three external walls;

b) positioned 100 mm above the level of the bund (sill) and 100 mm below the roof and not more than 450mm apart; and

c) able to ventilate the store at a minimum cycle of five total air changes per hour.

D.4.9.3 In areas where persistent and severe dust storms occur, care shall be taken in the placement of vents in relation to wind direction.

D.4.9.4 Where natural ventilation cannot be effected, the store shall be equipped with a mechanical inlet and outlet ventilation system. The system shall have the capacity to change the total air content of the store at least five times per hour. The ventilators shall be firmly attached to the inside of the walls, and the bottom ventilators shall be affixed 100 mm above the level of the bund (sill) and on opposite walls to ensure cross ventilation.

D.4.9.5 A mechanical ventilation system shall be switched on at all times, except when it is switched off for repairs or replacement purposes. If the system breaks down irreparably, it shall be replaced without delay.

D.4.10 Lightning protection and discharge of electrostatic charges adequate protection against lightning shall be provided, and in areas where flammable substances are stored, appropriate measures shall be taken to :

a) prevent the accumulation of electrostatic charges, or to
b) discharge electrostatic charges under controlled circumstances.

D.5 Electrical equipment

D.5.1 All electrical equipment and fittings shall be installed and certified by a qualified electrician.

D.5.2 Whenever the store is not staffed, all electrical equipment and fittings, with the exception of the mechanical ventilation system, if applicable, shall be switched off.

D.6 Security

D.6.1 Only the farm owner and the farm worker(s) appointed by the farm owner to be responsible for the store shall have access to the keys and be allowed into the store.

D.6.2 The area around the pesticide store shall be secured against entry of unauthorized persons, stray animals, and vermin by a wall or a fence at least 1,8 m high round the site. The fence or wall shall be provided with a lockable gate. A clear strip of width at least 1 m along the inner perimeter, and, if possible, also along the outer perimeter, of the fence shall be provided. The installation of security lighting, directed at the fence and not at the site contents, is recommended.

D.6.3 All windows shall be barred against unauthorized entry and should preferably be above head height (see D.4.7.1).

D.7 Separation and segregation

D.7.1 The store shall be used for the storage of pesticides only, and, if relevant, packaging material and equipment used for the application of pesticides.

D.7.2 A separate bunded facility shall be used for preparation, dilution and mixing operations. An eyewash bottle and a washbasin with running water shall be installed in the area.

D.7.3 A separate fenced-off and lockable area shall be provided in the store for all pesticides classified as danger group I(a) and danger group I(b) pesticides in terms of US 1792-1.

D.7.4 Flammable liquids shall be stored in a separate room or enclosure of the store. The room or enclosure shall be ventilated to the open air in such a manner that vapour cannot accumulate inside the store. The room or enclosure shall be clearly marked with the flammable liquid hazard class diamond (see table D.1) and the applicable symbolic safety signs in accordance with US ISO 7010. An adequate amount of firefighting equipment shall be installed as recommended by the local fire authority (see D.11.1.2 and annex F).

D.7.5 Liquid products shall be stored on the lower shelves or racks. The powder and granular formulations shall be stored on shelves above the liquid products. This is to provide for minimum damage in the event of accidental leakage of liquid during storage.

D.7.6 Cement floors tend to sweat. To ensure that pesticides in fibre board boxes, paper bags and fibre board drums are not damaged, they shall be placed on pallets and shall not be stacked against a wall. Plastics and metal drums of capacity 20 L or more shall not be stacked more than two tiers high.

D.8 Warning notices, symbolic safety signs and product labels

D.8.1 General

D.8.1.1 All symbolic safety signs and warnings shall be relevant and appropriate, and shall be so positioned that they are:

a) clearly visible at all times,

b) not subject to misinterpretation, and

c) not subject to damage during normal storage operations.

D.8.1.2 All farm workers shall undergo training in the meaning of the signs, warning notices, and labels on pesticide containers.

D.8.2 Warning notices

D.8.2.1 Outside the store

D.8.2.1.1 At the entrance to the store the warning "Storage of pesticides – Unauthorized entry prohibited" shall be displayed in red letters against a white background. The warning notice shall be in one of the official languages and in at least one other language indigenous to the region. The height of the letters shall be at least 75 mm.

D.8.2.1.2 A warning notice "Storage of pesticides – Unauthorized entry prohibited" in red letters against a white background shall be posted round the fence of the storage area. The warning notice shall be in one of the official languages and in at least one other language indigenous to the region. The height of the letters shall be at least 75 mm.

D.8.2.2 Inside the store

Every type of storage area and utility area inside the store shall be clearly demarcated, for example separate storage areas for poisons, flammables and corrosives shall display the relevant hazard class diamonds (see table D.1). The dimensions of the hazard class diamonds shall be at least 250 mm × 250 mm.

D.8.3 Symbolic safety signs

Symbolic safety signs in accordance with the requirements of US ISO 7010 shall be displayed at the entrance to the store, and inside the store, to denote the safety-related features of the store, for example

a) no smoking,

b) no naked flames, and

c) no fires.

The dimensions of the symbolic safety signs shall be at least 290 mm × 290 mm.

D.8.4 Product labels

D.8.4.1 The sale, acquisition, use and disposal of a pesticide other than in a container and with a label as approved by the relevant national authority are strictly prohibited unless

a) the pesticide is applied for the purpose of conducting trials, and

b) prior approval has been obtained from the Registrar.

D.8.4.2 Pesticides in packages and containers that are not clearly and indelibly labelled shall not be accepted or used.

D.8.4.3 Every farm worker working with pesticides shall be trained in the:

a) meaning of the symbols on the labels, and

b) interpretation of the written instructions.

D.9 Responsible persons

D.9.1 One or more literate farm workers shall be made responsible for managing the store when the farmer does not do so himself. Such (a) person(s) shall be properly trained in the handling of pesticides and shall understand the implications of careless and incorrect handling.

D.9.2 The responsible farm worker(s) shall check every container on receipt to ensure that the correct product has been delivered.

D.9.3 No leaking container shall be accepted. Any leaking container shall be isolated and returned to the supplier.

D.9.4 The responsible farm worker(s) shall ensure that the oldest product for a certain application is used first. This can be determined by the date of manufacture on the product label or by recording the date of receipt on each container with waterproof ink.

D.10 Record keeping

D.10.1 The responsible farm worker(s) (see D.6.1) shall keep a written or electronic record for each product received, dispatched and used.

D.10.2 It is recommended that, on receipt of a pesticide from a supplier, at least the following information be recorded:

a) product name;

b) batch number;

c) name and address of supplier;

d) and date of receipt;

e) name of the responsible person who received the product; and

f) purpose for which the product is to be applied.

D.10.3 Records shall be kept of all the products that are used and of the balance of products in the store.

D.10.4 The records shall be kept in a safe place away from the storage area, and shall be available at all times for inspection by national, provincial or local or authorities, as applicable.

D.11 Fire protection and emergency planning

D.11.1 Fire protection

D.11.1.1 The store and the area around the store shall be designated a non-smoking area.

Symbolic safety signs in accordance with the requirements of US ISO 7010 prohibiting smoking and open flames shall be prominently displayed in appropriate places (see also D.8.3).

D.11.1.2 Portable fire extinguishers, as specified in US ISO 7159 and US ISO 11602-2 shall be provided, unless the local fire authority is of the opinion that a larger number of fire extinguishers need to be installed.

D.11.1.3 A fire hose shall be mounted on the outside of the store and shall be connected to a water supply.

D.11.1.4 It is recommended that a sprinkler system be installed in a store of capacity 9 m^3 or larger.

D.11.1.5 Fire extinguishers (see D.11.1.2) shall be inspected and maintained by a registered person in accordance with the provisions of US ISO7159 and US ISO11602-2, at least once every twelve months.

D.11.2 Emergency planning

D.11.2.1 Emergency telephone numbers

The emergency telephone numbers of the nearest poison centre, medical practitioner, hospital and ambulance service shall be clearly displayed at the entrance and inside the store. The person(s) responsible for the store shall have access to these numbers and a telephone in case of an emergency.

D.11.2.2 First aid

D.11.2.2.1 It is recommended that at least one of the farm workers be trained in basic first aid.

Sufficient information on the relevant first-aid procedures for the pesticides in the store shall be available in a prominent place.

D.11.2.2.2 Soap, a clean towel and running water shall be available near the operation area, but so located as to avoid contamination by pesticides.

Annex E
(normative)

The storage of pesticides in distribution stores

E.1 General

This annex gives requirements for management practices relating to the storage of pesticides intended for distribution and not exceeding the quantities given in table E.1.

E.2 Local authority approval

E.2.1 Pesticides intended for distribution shall not be stored in any premises unless application has been made to the local authority, the necessary permission has been obtained from all relevant departments (local fire authority, public health, sewerage, building inspectorate, etc.), and a certificate of occupancy has been issued by the local authority in accordance with the national building regulations (see foreword). All permits shall be renewed as necessary, and as required by the local authority. The continuation of a distribution store operation without the prescribed permits is not permitted.

E.2.2 When there is a change of occupancy of an existing building or part of a building to distribution storage, the building (or part of the building) shall comply fully with the national building regulations (see E.2.1).

E.2.3 Early consultation with the relevant authorities is recommended, as is the provision of an adequate brief covering the intended use of the premises and the goods intended to be stored. In this way, the necessary permits, such as flammable liquids permits, can be applied for in good time and the need to apply costly additional measures, such as fire safety measures, after the premises are otherwise ready for occupation, could be avoided.

E.3 Site location

A company or an organization, when applying for approval to set up or extend a pesticide distribution store, shall undertake an environmental impact assessment, and, in so doing, shall take the following into account: the nature of the goods to be stored, proposed stock levels (taking into account seasonal variations) and the degree of hazard that will be presented; the zoning or land-use requirements of the local authority;

NOTE Preference should be given to isolated locations or sites devoted to industrial development. fire protection, security, and general service facilities in the area;

a) proximity to houses, schools, hospitals, shopping areas, food manufacturers and offices;

b) proximity to water courses (surface and underground) and to open storm-water channels. Measures shall be taken to prevent any contaminated water from entering a natural water source;

c) proximity to combustible vegetation;

d) prevailing winds and other climatic factors;

e) the highest recorded flood level in the proposed storage area, and the susceptibility of the area to flooding;

f) water table depths, soil types and existing boreholes within 500 m of the site;

g) access to the site, and in particular to buildings, by emergency services vehicles, preferably from two sides;

h) the distribution store shall be a stand-alone building and shall be at least 10 m away from any dwelling or livestock, or from where fodder, feeds, or fuel are stored. A minimum of 5 m between the distribution store and other buildings is recommended. If the distribution store is part of a complex, it shall be totally sealed off from the rest of the complex. There should be no free movement of air between the storage area and the rest of the complex; and

i) suitable access for loading and unloading of delivery vehicles.

E.4 Construction of a distribution store

E.4.1 General

E.4.1.1 The building design and construction shall comply with the national building regulations (see foreword), relative to the occupancy class (es) of the building(s) concerned. Where the provisions of this clause conflict with those of the national building regulations, the latter shall apply, except that where the provisions of this clause are more stringent than those of the national building regulations, the provisions of this clause shall apply. This clause shall be read in conjunction with the relevant national regulations (see foreword) and statutory provisions, and any provincial or local regulatory requirements that deal with the environment for the workplace.

E.4.1.2 Load-bearing construction elements, walls, floors, doors and gates shall be made of non-combustible materials that are impervious to the pesticides to be stored. It is recommended that load-bearing roof components be made of fire-retardant timber.

E.4.2 Frame

The frame of a distribution store shall be of concrete or steel. A steel frame shall be fire protected to give the required stability.

E.4.3 Floors and spillage containment

E.4.3.1 Floors

Floors shall be of concrete or of another material impervious to liquids and to the pesticides to be stored. Floors in storage areas shall be of sufficient load-bearing capacity to withstand the weight of stock, racking and any mechanical handling equipment to be used. Floors shall be smooth but not slippery (even when wet), free from cracks to facilitate cleaning, and so designed as to contain leakage and contaminated firefighting water by means such as a surrounding sill, kerb or bund wall (see also E.4.3.2.3).

E.4.3.2 Spillage containment

E.4.3.2.1 Retention facilities shall be provided in a distribution store, marshalling areas and loading zones to contain any spills or firefighting water and to allow safe treatment of the spills prior to disposal.

E.4.3.2.2 The size and design of the containment facility will depend on estimates, preferably based on the worst-case scenario, of

a) the quantities and the properties of the goods likely to escape,

b) the quantity of firefighting water or rainwater that will accumulate,

c) the concentration of products in these waters, and

d) the required retention time before appropriate effluent treatment and disposal can be accomplished.

E.4.3.2.3 The kerb, sill or bund wall that forms the perimeter of the floor shall be at least 200 mm high and 110 mm wide (two layers of bricks). The floor and the bund wall shall be plastered and sealed, with ramps inclined to a gradient of 1 in 10 to allow for vehicle access.

E.4.3.2.4 Provision for closing off existing drains shall be included in order to minimize the risk of contaminated water reaching natural water sources.

E.4.4 Walls

External walls should preferably be of masonry or they can be clad with metal (steel or similar) cladding. Aluminium cladding shall not be used.

E.4.5 Doorways and emergency exits

E.4.5.1 Sufficient entrance and exit doorways or openings shall be provided to enable normal storage operations to be carried out without security being compromised.

E.4.5.2 Emergency exits shall be provided in addition to the main exits. Depending on the size and the location of a distribution store, and the number of people working therein, a distribution store shall be provided with at least two emergency exits situated as far apart as is practicable.

E.4.5.3 All emergency exits shall be clearly marked and all escape routes shall be indicated by means of the relevant symbolic safety signs in accordance with US ISO 7010

E.4.6 Fire doors

E.4.6.1 Wherever possible, offices, formulation operations and amenities shall be located away from the main body of the distribution store. If such facilities are located within the distribution store structure, they shall be segregated from the storage area and shall be fitted with self-closing fire doors (see E.4.6.2). Furthermore, an exit other than via the distribution store shall be available.

E.4.6.2 All openings in separating walls shall be fitted with self-closing fire-door assemblies of at least the same fire resistance as the wall itself, and that comply with the requirements of SANS 1253.

E.4.7 Doors

E.4.7.1 Steel doors are preferable to wooden doors. The doors shall have security gates to reduce the risk of forced entry. Doors shall be raised200 mm to accommodate bunding (see E.4.3.2.3).

E.4.7.2 The exit doors of the distribution store shall open to the outside and shall have locks and keys as approved by the local fire authority. The exit doors shall at all times be capable of being opened easily from the inside without the use of a key.

E.4.8 Roofs

The roof shall not leak and shall be insulated with non-combustible material such as mineral wool or glass fibre so as to maintain the temperature of the distribution store at a reasonable level.

E.4.9 Windows

E.4.9.1 Windows shall allow enough daylight into the distribution store for product labels to be read. Where natural light is insufficient, it shall be supplemented with artificial lighting. All windows shall be weatherproof and burglar-barred, and should preferably be above head height ("out of sight out of mind") for security reasons.

E.4.9.2 The window frames shall be manufactured of steel and shall:

a) be fitted with wire glass of minimum thickness 8 mm, and

b) have window panels of maximum size 450 mm × 450 mm.

E.4.9.3 No windows shall be capable of being opened.

E.4.10 Lightning protection and discharge of electrostatic charges

In areas where flammable substances are stored, appropriate measures shall be taken to:

a) prevent the accumulation of electrostatic charges; or

b) discharge electrostatic charges under controlled circumstances.

E.4.11 Ventilation

E.4.11.1 A distribution store shall be so designed and constructed as to ensure that the fumes of hazardous substances are effectively ventilated in all parts of the distribution store, either by adequate natural ventilation or by mechanical draught ventilation that ensures at least five changes of air per hour. The fumes shall be released to the open air in such a way that they are not likely to come into contact with sources of ignition that might ignite them.

E.4.11.2 Natural ventilation of the distribution store can be achieved by the installation of non-combustible airbricks of size at least 140 mm × 215 mm and that are provided with non-corrosive gauze wire of nominal opening diameter at least 0,5 mm. The airbricks shall be:

a) provided in at least three external walls;

b) positioned 100 mm above the level of the bund (sill) and 100 mm below the roof and not more than 450 mm apart; and

c) able to ventilate the distribution store at a minimum cycle of five total air changes per hour.

E.4.11.3 In areas where persistent and severe dust storms occur, care shall be taken in the placement of vents in relation to wind direction.

E.4.11.4 Where natural ventilation cannot be effected, the distribution store shall be equipped with a mechanical inlet and outlet ventilation system. The system shall have the capacity to change the total air content of the distribution store at least five times per hour.

E.4.11.5 A mechanical ventilation system shall be switched on at all times, except when it is switched off for repairs or replacement purposes. If the system breaks down irreparably, it shall be replaced without delay.

E.4.12 Electrical equipment

E.4.12.1 All electrical equipment and fittings shall be installed and certified by a qualified electrician.

E.4.12.2 Only distribution boxes, fuses and other electrical equipment installed and protected shall be installed inside the distribution store.

Equipment that is not installed and protected shall be situated outside the distribution store so as not to come into contact with pesticide fumes that might be emitted.

E.4.12.3 Whenever the distribution store is not staffed, all electrical equipment and fittings, with the exception of the mechanical ventilation system, shall be switched off.

E.4.12.4 Battery charging facilities for electrically operated forklift trucks should preferably be in an open-sided, covered area within the marshalling area.

Alternatively, the room or area shall be well ventilated at all times and shall not be accessible directly from the distribution store. The vents in such a room or area shall be positioned as high as possible in the walls to prevent the accumulation of hydrogen gas.

E.5 Storage technology

E.5.1 The storage technology to be implemented in a distribution store depends on the quantity and types of pesticides to be stored, the scale of the storage operation, the turnover rate, and logistical and economic factors.

E.5.2 A distribution store shall be equipped with racks or shelves that are impervious and chemically resistant to the stored chemicals. Liquid products shall be stored on the lower racks or shelves. Powder and granular formulations shall be stored on shelves above the liquid products. This is to provide for minimum damage in the event of accidental leakage of liquid during storage.

E.5.3 Cement floors tend to sweat. To ensure that pesticides in fibreboard boxes, paper bags and fibreboard drums are not damaged, they shall be placed on pallets and shall not be stacked against a wall. Plastics and metal drums of capacity 20 L or more shall not be stacked more than two tiers high.

E.5.4 Flammable liquids shall be stored in a separate room or enclosure of the distribution store (see also E.6.3). The room or enclosure shall be ventilated to the open air in such a manner that vapour cannot accumulate inside the distribution store. The room or enclosure shall be clearly marked with the flammable liquid hazard class diamond (see table D.1) and the applicable symbolic safety signs in accordance with SANS 1186-1. An adequate amount of firefighting equipment shall be installed as recommended by the local fire authority (see E.9.1.2 and annex F).

E.6 Distribution store management

E.6.1 Security

E.6.1.1 Access to a distribution store, unless authorized by the distribution store manager, shall be prohibited at all times. An appropriate entry-pass system shall be implemented.

E.6.1.2 Outside normal working hours, all doors shall be locked. All windows shall be barred against unauthorized entry and should preferably be above head height (see E.4.9.1).

E.6.1.3 If a distribution store is part of a larger complex of buildings, or stands in its own grounds, the perimeter of the property shall be protected by means of a wall or a fence of height 1.8 m that has at least two strands of electric wiring, or a coil razor wire, or similar protection, on top. The installation of security lighting, directed at the fence and not at the site contents, is recommended.

E.6.1.4 The number of gates in the perimeter wall or fence shall be the minimum necessary to allow normal operations, except that, if possible, emergency service vehicles shall be able to gain access to the distribution store from at least two sides.

E.6.1.5 Names and contact telephone numbers of persons to be called in an emergency shall be given to security personnel, the local police and the local fire authority. A system shall be in place to ensure that the persons called have access to the keys of the distribution store. All keys shall be labelled.

E.6.1.6 If a distribution store is situated in a relatively heavily populated or environmentally sensitive area, and if the scale of operations permits, a 24-hour manning of the security function, with regular patrols, shall be carried out. In such a case, a procedure shall be instituted to verify that patrols actually take place, especially at night.

E.6.2 Receipt and dispatch

E.6.2.1 A distribution store shall have separate loading and unloading bays to facilitate safe, efficient and secure receipt and dispatch.

E.6.2.2 (A) person(s) trained in all aspects related to the loading and unloading of dangerous goods shall be present while loading or unloading is in progress.

E.6.2.3 All goods received shall be checked against the relevant invoice, delivery note, bill of lading or dangerous goods declaration, and any discrepancies shall be dealt with in a safe and responsible manner.

E.6.2.4 No pesticides shall be accepted for storage if MSDSs for the goods have not been provided by the supplier of the goods.

E.6.2.5 During receipt and prior to dispatch, the person in charge of these functions shall ensure that:

a) the packaging, marking and labelling provisions, as applicable, have been complied with;

b) the vehicle to be used for transport is in a clean condition; and

c) appropriate action is taken in the event of non-compliance.

E.6.2.6 Care shall be taken during receipt and dispatch operations to ensure that incompatible pesticides are not allowed to come into contact with one another (see also E.6.3). A system shall exist that prevents the uncontrolled or indiscriminate simultaneous loading and unloading of more than one vehicle at a time.

E.6.3 Separation and segregation

E.6.3.1 The general principles to be applied in product separation and segregation shall be based on a detailed knowledge of the properties of, and the hazards associated with, the pesticides to be stored. US 1792-1 classifications and MSDS information are of vital importance in this regard.

The following general provisions shall apply in all cases. Flammable pesticides will greatly increase the risk of a toxicant fire if stored in the same area as toxic pesticides. If non-toxic themselves, flammable pesticides will normally not contaminate fire- fighting water; and flammable non-toxic pesticides and non-flammable pesticides shall be separated from flammable pesticides and aerosols. Flammable pesticides shall be segregated from oxidizing substances and corrosives.

NOTE See E.5.4 with regard to the storage of flammable liquids.

E.6.3.2 A separate bunded facility shall be used for preparation, dilution and mixing operations. An eyewash bottle and a washbasin with running water shall be installed in the area. A separate fenced-off and lockable area shall be provided in the distribution store for all pesticides classified as danger group Ia and danger group Ib pesticides in terms of US 1792-1

E.7 Warning notices, symbolic safety signs and product labels

E.7.1 Warning notices

E.7.1.1 At the entrance to the distribution store the warning “Storage of pesticides – Unauthorized entry prohibited” shall be displayed in red letters against a white background. The warning notice shall be in one of the official languages and in at least one other language indigenous to the region. The height of the letters shall be at least 75 mm.

E.7.1.2 Each type of storage area and utility area inside the distribution store shall be clearly demarcated, for example separate areas for poisons, flammables and corrosives shall display the relevant hazard class diamonds (see table D.1). The dimensions of the hazard class diamonds shall be at least 250 mm × 250 mm.

E.7.2 Symbolic safety signs

Symbolic safety signs in accordance with the requirements of US ISO 7010 shall be displayed at the entrance to the distribution store, and inside the distribution store, to denote the safety-related features of the distribution store, for example

a) no smoking;

b) no naked flames; and

c) no fires.

The dimensions of the symbolic safety signs shall be at least 290 mm × 290 mm.

E.7.3 Product labels

E.7.3.1 The sale, acquisition, use and disposal of a pesticide other than in a container and with a label as approved by the relevant national authority (see foreword) are strictly prohibited unless

a) the pesticide is applied for the purpose of conducting trials, and

b) prior approval has been obtained from the Registrar.

E.7.3.2 Pesticides in packages and containers that are not clearly and indelibly labelled shall not be accepted or used.

E.7.3.3 Every operator shall be trained in the:

a) meaning of the symbols on the labels, and

b) interpretation of the written instructions.

E.8 Responsibilities of the distribution store manager

E.8.1 General

The responsibilities of the distribution store manager shall be stipulated in writing. These responsibilities include the assurance that:

a) all safety, operating and emergency procedures are adhered to;

b) stock records are kept up to date and are readily available;

c) hazard and risk areas are clearly marked; and

d) workers are trained in all operations, and in particular in the safe handling of pesticides.

E.8.2 Record keeping

E.8.2.1 The distribution store manager shall keep a written or electronic record for each product received, dispatched and used.

E.8.2.2 It is recommended that, on receipt of a pesticide from a supplier, at least the following information be recorded:

a) product name;

b) batch number;

c) name and address of supplier;

d) quantity and date of receipt; and

e) name of the person who received the product.

E.8.2.3 Records shall be kept of all the products that are distributed and of the balance of products in the distribution store.

E.8.2.4 The records shall be kept in a safe place away from the storage area, and shall be available at all times for inspection by national, provincial or local authorities, as applicable.

E.9 Fire protection and emergency planning

E.9.1 Fire protection

E.9.1.1 The distribution store and the area around the distribution store shall be designated a non-smoking area. Symbolic safety signs in accordance with the requirements of US ISO 7010 prohibiting smoking and open flames shall be prominently displayed in appropriate places (see also E.7.2).

E.9.1.2 Portable fire extinguishers, as specified in US ISO 7159 and US ISO 11602-2 shall be provided, unless the local fire authority is of the opinion that a larger number of fire extinguishers need to be installed.

E.9.1.3 A fire hose shall be mounted on the outside of the distribution store and shall be connected to a water supply.

E.9.1.4 A sprinkler system can be considered but need not be installed if the distribution store is of capacity 9 m3or larger and is equipped with suitable manual firefighting equipment.

E.9.1.5 Fire extinguishers shall be inspected and maintained by a registered person in accordance with the provisions of US ISO 7159 and US ISO 11602-2 at least once every twelve months.

E.9.2 Emergency planning

E.9.2.1 General

E.9.2.1.1 The health and safety representative(s) or the health and safety committee of the distribution store shall develop an on-site emergency plan in consultation with the local emergency services. Any risks related to the health and safety of the public in the event of an incident shall be taken into consideration.

E.9.2.1.2 The on-site emergency plan shall be updated at least once every three years in consultation with the local emergency services. A copy of the emergency plan shall be signed by the manager of the distribution store in the presence of two witnesses, who shall attest the signature.

E.9.2.1.3 All operators shall be conversant with the on-site emergency plan, and it shall be readily available at all times for implementation and use.

E.9.2.1.4 The on-site emergency plan shall be tested (by means of an emergency exercise) at least once a year, and a record shall be kept of each such emergency exercise.

E.9.2.2 Emergency training

E.9.2.2.1 All operators shall be trained in the use of the different types of fire extinguishers on site, and shall practise their duties as set out under the emergency plan.

E.9.2.2.2 The emergency training shall include:

a) initiation of the alarm;

b) correct use of the firefighting equipment;

c) evacuation procedures;

d) roll calls; and

e) fire drills.

E.9.2.3 Emergency telephone numbers

The emergency telephone numbers of the nearest poison centre, medical practitioner, hospital and ambulance service shall be clearly displayed at the entrance and inside the distribution store. The person(s) in charge of the distribution store shall have access to these numbers and a telephone in case of an emergency.

E.9.2.4 First aid

E.9.2.4.1 Basic first-aid requirements and the items required for a first-aid kit are given in annex B.

E.9.2.4.2 The employer shall provide a first-aid kit at, or near, the area where more than five operators are working. The first-aid kit shall be readily available and accessible.

E.9.2.4.3 Where more than 10 people are employed, and for every group of 50 operators, at least one person shall be trained in first aid and shall be readily available during normal working hours. Such (a) person(s) shall be in possession of a valid first-aid certificate issued by an organization approved for this purpose by the relevant national authority (see foreword).

E.9.2.4.4 Eyewash bottles and safety shower facilities shall be available in different areas of the distribution store in case of accidental exposure of (an) operator(s) to a pesticide. The MSDSs of the pesticides stored shall be readily available at a central location for reference to the actions to be taken in the event of an incident.

E.10 Hygiene and personal safety

E.10.1 Smoking and the consumption of food and drink in the distribution store shall be prohibited. Suitable signs to this effect in accordance with US ISO 7010 shall be displayed. (A) separate tea room(s) or eating-place(s) shall be available on the premises.

E.10.2 Adequate washing facilities (in accordance with clause 8) and personal protective clothing and equipment (in accordance with clause 7) shall be provided.

E.10.3 The following operations shall be prohibited in a distribution store:

a) repacking or refilling (or both);

b) vehicle maintenance; and

c) overnight garaging of any vehicles or motorized equipment, including forklift trucks.

E.10.4 For high-risk activities (for example welding and cutting), a formal procedure shall be established for the handover of responsibilities from the manager of the distribution store to the outside contractor undertaking the work.

AnnexF
(normative)

Fire fighting procedures

F.1 The following fire fighting and ancillary equipment shall be available in establishments where pesticides are handled and stored:

a) protective clothing, respirators and self-contained breathing apparatus, as described in clause 7;

b) gas sampling pumps and appropriate detection tubes;

c) portable fire extinguishers in accordance with US ISO 7159;

d) portable and wheeled fire extinguishers in accordance with US ISO 11602-2;

f) explosimeter;

g) 25 kg bags of hydrated (slaked) lime or soda ash;

h) 5 L containers of laundry bleach;

i) 25 kg bags of dry sawdust;

j) a supply of empty sacks and labels for contaminated sawdust;

k) two large brooms, two shovels and a squeegee;

l) one stainless steel 250 mm funnel;

m) one 25 L open-head drum;

n) one 200 L open-head drum; and

o) salvage packaging and slings for transferring leaking drums into the salvage packaging

F.2 When a fire breaks out in a handling or storage area, the emergency services shall be notified immediately.

F.3 Spectators shall be kept away from fires that involve pesticides, and all persons downwind from such fires shall be evacuated. Respiratory equipment, preferably self-contained (air-supplied) breathing apparatus, shall be worn by all persons involved in extinguishing the fire, and, when there is a wind, they shall not work from the downwind direction. Firefighters shall not eat, drink or smoke in the fire fighting area.

F.4 Small fires involving pesticides can be extinguished with dry chemical powder (or a hand foam unit) or carbon dioxide.

F.5 Foam shall be used where large volumes of pesticides and, in particular, flammable liquids are burning. Alcohol-resistant foam shall be used where flammable water-soluble concentrates or emulsifiable concentrates are involved.

F.6 Water fog or water spray shall be used to extinguish medium-sized fires, unless stacks of paper bags or fibreboard containers or phosphine-releasing compounds are involved. Water mists or fogs, or soft streams of water shall be used to preclude the breakage of glass containers and the melting of plastics containers. The volume of water used to extinguish the fire shall be kept to a minimum so that the least possible toxic run-off is

produced. When relevant, the run-off shall be contained to prevent it from entering sewers, water supplies or low-lying areas. Drums containing liquids shall be cooled with a water spray to prevent them from exploding or rupturing.

F.7 Stacks of paper bags or fibreboard containers can be protected by a water curtain if care is taken to avoid wetting them.

Annex G
(normative)

Warehousing of pesticides

G.1 Local authority approval

G.1.1 No warehousing operation shall be started in any premises unless application has been made to the local authority, the necessary permission has been obtained from all relevant departments (local fire authority, public health, sewerage, building inspectorate, etc.), and a certificate of occupancy has been issued by the local authority in accordance with the national building regulations (see foreword). All permits shall be renewed as necessary, and as required by the local authority. The continuation of a warehouse operation without the prescribed permits is not permitted.

G.1.2 When there is a change of occupancy of an existing building or part of a building to warehousing, the building (or part of the building) shall comply fully with the national building regulations (see G.1.1).

G.1.3 Early consultation with the relevant authorities is recommended, as is the provision of an adequate brief covering the intended use of the premises and the goods intended to be stored. In this way, the necessary permits, such as flammable liquids permits, can be applied for in good time and the need to apply costly additional measures, such as fire safety measures, after the premises are otherwise ready for occupation, could be avoided.

G.2 Site location

A company or an organization, when applying for approval to set up or extend a warehouse, shall undertake an environmental impact assessment, and, in so doing, shall take the following into account:

a) the nature of the goods to be stored, proposed stock levels (taking into account seasonal variations) and the degree of hazard that will be presented;

b) the zoning or land-use requirements of the local authority;

NOTE Preference should be given to isolated locations or sites devoted to industrial development.

c) fire protection, security, and general service facilities in the area;

d) proximity to houses, schools, hospitals, shopping areas, food manufacturers and offices;

e) proximity to water courses (surface and underground) and to open storm-water channels. Measures shall be taken to prevent any contaminated water from entering a natural water source;

f) proximity to combustible vegetation;

g) prevailing winds and other climatic factors;

h) the highest recorded flood level in the proposed storage area, and the susceptibility of the area to flooding;

i) water table depths, soil types and the location of existing boreholes within 500 m of the site;

j) access to the site, and in particular to buildings, by emergency services vehicles, preferably from two sides;

k) safe escape from the effects of fire or other hazards in each of the proposed buildings on site;

NOTE Buildings should ideally be stand-alone with a space of at least 22 m between the buildings and the surrounding property.

l) suitable access for the loading and unloading of delivery vehicles;

m) the adequacy of the services to be provided, for example electricity and emergency supplies if needed, potable and fire fighting water supply, and drainage that either prevents ground run-off to public sewers and storm-water drains or allows run-off to a waste treatment plant intended to be used for on-site containment of run-off water and spills; and

n) future expansion.

G.3 Warehouse construction

G.3.1 General

G.3.1.1 The building design and construction shall comply with the national building regulations (see foreword), relative to the occupancy class (es) of the building(s) concerned. Where the provisions of this clause conflict with those of the national building regulations, the latter shall apply, except that where the provisions of this clause are more stringent than those of the national building regulations, the provisions of this clause shall apply. This clause shall be read in conjunction with the national regulations (see foreword) and statutory provisions, and any provincial or local regulatory requirements that deal with the environment for the workplace.

G.3.1.2 The recommendations of US ISO 7240-14:2013 shall be taken into account with regard to the fire prevention and fire fighting aspects of buildings.

G.3.1.3 An enclosed warehouse shall be substantially closed in, shall be lockable, and shall not have more windows or open spaces in the walls or roof than are necessary to provide an adequate degree of natural lighting during the day and the necessary ventilation at all times.

G.3.1.4 Load-bearing construction elements, walls, floors, doors and gates shall be made of non-combustible materials that are impervious to the pesticides to be stored. It is recommended that load-bearing roof components be made of fire-retardant timber.

G.3.2 Frame

The frame of a warehouse shall be of concrete or steel. A steel frame used for an enclosed warehouse shall be fire protected to give the required stability.

G.3.3 Floors and spillage containment

G.3.3.1 Floors

Floors shall be of concrete or of another material impervious to liquids and to the pesticides to be stored. Floors in storage areas shall be of sufficient load-bearing capacity to withstand the weight of stock, racking and any mechanical handling equipment to be used. Floors shall be smooth but not slippery (even when wet), free from cracks to facilitate cleaning, and so designed as to contain leakage and contaminated fire fighting water by means such as a surrounding sill, kerb or bund wall (see also G.3.3.2.3).

G.3.3.2 Spillage containment

G.3.3.2.1 Retention facilities shall be provided in stock warehouses, marshalling areas and loading zones to contain any spills or fire fighting water and to allow safe treatment prior to disposal.

G.3.3.2.2 The size and design of the containment facility will depend on estimates, preferably based on a worst-case scenario of the:

a) quantities and the properties of the goods likely to escape,

b) quantity of fire fighting water or rainwater that will accumulate,

c) concentration of products in this water, and

d) required retention time before appropriate effluent treatment and disposal can be accomplished.

G.3.3.2.3 The kerb, sill or bund wall that forms the perimeter of the floor shall be at least 200 mm high and 110 mm wide (two layers of bricks). The floor and the bund wall shall be plastered and sealed, with ramps inclined to a gradient of 1 in 10 to allow for vehicle access.

Alternatively, a sump of capacity 10 % of the total available storage volume can be constructed. For large installations, the sump shall be provided with pneumatically controlled valves that are always in the closed position. As a precaution to control contamination of water sources, sampling of the sump water shall be carried out before it is released.

G.3.3.2.4 Provision for closing off existing drains shall be included in order to minimize the risk of contaminated water reaching natural water sources.

G.3.4 Walls

G.3.4.1 External walls should preferably be of masonry or they can be clad with metal (steel or similar) cladding. Aluminium cladding shall not be used.

G.3.4.2 Internal division walls designed as fire breaks shall provide at least 90 min resistance and should extend to a height of 1 m above the roof. In order to achieve the desired fire resistance, reinforced concrete walls shall be at least 15 cm thick, and brick walls at least 23 cm thick. Hollow concrete blocks shall not be used. Furthermore, separating walls shall be non-load-bearing and shall be independent of the main structure of the building.

G.3.4.3 Where piping, ducting and electric cables penetrate a separating wall, they shall be either placed in fire-retardant sand cups or so sealed as to prevent the spread of fire.

G.3.5 Windows

G.3.5.1 Windows shall allow enough daylight into the warehouse for product labels to be read. Where natural light is insufficient, it shall be supplemented with artificial lighting (see G.3.10). All windows shall be weatherproof and burglar-barred, and should preferably be above head height ("out of sight out of mind") for security reasons.

G.3.5.2 The window frames shall be manufactured of steel and shall

a) be fitted with wire glass of minimum thickness 8 mm, and

b) have window panels of maximum size 450 mm × 450 mm.

G.3.5.3 No windows shall be capable of being opened.

G.3.6 Doorways and emergency exits

G.3.6.1 General

G.3.6.1.1 Sufficient entrance and exit doorways or openings shall be provided to enable normal warehousing operations to be carried out without security being compromised.

G.3.6.1.2 All exit doors shall be easy to open in the dark or in dense smoke.

G.3.6.2 Emergency exits

G.3.6.2.1 Emergency exits shall be provided in addition to the main exits. Depending on the size and the location of a warehouse, and the number of people working therein, a warehouse shall be provided with at least two emergency exits situated as far apart as is practicable.

G.3.6.2.2 A large warehouse shall be provided with additional emergency exits at a maximum distance of 20 m from any point in the warehouse.

G.3.6.2.3 All emergency exits shall be clearly marked, and all escape routes shall be indicated by means of the relevant symbolic safety signs in accordance with US ISO 7010.

G.3.6.3 Fire doors

G.3.6.3.1 Wherever possible, offices, formulation operations and amenities shall be located away from the main body of a warehouse. If such facilities are located within the warehouse structure, they shall be segregated from the storage area and shall be fitted with self-closing fire doors (see

G.3.6.3.2) Furthermore, an exit other than one via the warehouse shall be available.

G.3.6.3.2 All openings in separating walls shall be fitted with self-closing fire-door assemblies of at least the same fire resistance as the wall itself, and that comply with the requirements of

G.3.6.3.3 Each door provided for forklift truck access through separating walls shall be fitted with a fusible link or a link activated by an automatic fire detection system to ensure automatic closure of the door in the event of fire. The space required for closure shall be kept free from obstruction.

G.3.7 Roofs

G.3.7.1 Roofs can be of a lightweight, friable construction, should preferably be of pitched design and should readily fall in the event of fire, in order to provide relief from smoke and heat.

G.3.7.2 Roofs of solid construction shall be provided with ventilation panels for early removal of smoke and heat to improve visibility of the source of the fire and to retard the lateral spread of fire.

G.3.7.3 The recommended fire rating for roofs is 30 min to 60 min.

G.3.7.4 If roof insulation is used, it shall be of a non-combustible material, such as mineral wool or glass fibre.

G.3.7.5 Metal roof support constructions shall be protected against thermal impact.

G.3.8 Lightning protection and discharge of electrostatic charges

G.3.8.1 Adequate protection against lightning shall be provided in accordance with the relevant provisions of US IEC 62305-1:2010. Lightning protection systems shall be maintained and inspected.

G.3.8.2 In areas where flammable substances are stored (see G.4), appropriate measures shall be taken to:

a) prevent the accumulation of electrostatic charges, or to

b) discharge electrostatic charges under controlled circumstances.

G.3.9 Ventilation, air conditioning and heating

G.3.9.1 Ventilation

G.3.9.1.1 Every employer shall ensure that the workplace is adequately ventilated. Covered storage areas shall therefore be provided with either adequate natural ventilation or mechanical draught ventilation that ensures at least five changes of air per hour. In general, good ventilation occurs when vents are positioned both near the floor (above the bund levels) and near, or in, the roof. The fumes shall be released to the open air in such a way that they are not likely to come into contact with sources of ignition that might ignite them.

G.3.9.1.2 In order to ensure that excessive temperatures (for example temperatures above 35 °C) are not reached, good air circulation is necessary. This can be achieved by a clear space of 1 m being maintained between the top of most products and the roof, and also between the goods and the wall.

G.3.9.1.3 Where highly flammable gases or flammable liquids are stored, effective extraction shall be provided at or near floor level, and the ventilation shall be so efficient as to prevent the formation of an explosive atmosphere (see also G.4). A ventilation rate of up to 12 air changes per hour could be required in certain cases. Appropriate monitoring using an explosimeter is recommended. Where mechanical draught ventilation is applied, it shall be flameproof. It shall operate continuously during periods of normal operation and shall operate during periods when the warehouse is unmanned.

G.3.9.1.4 The following arrangements are appropriate for smoke and heat ventilation:

a) natural lighting openings covered with domes or strips of a plastics material;

b) automatically or manually opening exhaust shutters; and

c) permanent ventilation openings in or near the roof.

The positions of all openable panels in external walls shall be marked on the outside of the building to permit easy identification by fire authorities. Where the floor area of any room exceeds 500 m2, certain minimum size requirements could apply to ventilation openings in order to comply with the national building regulations (see foreword). Alternatively, a mechanical smoke ventilation system could be required.

G.3.9.2 Air conditioning

G.3.9.2.1 Air conditioning should preferably be of the ducted type, with the air-conditioning plant situated well away from the storage area. Individual electric air conditioners shall not be used in areas where flammable materials are stored.

G.3.9.2.2 Where it is necessary to humidify the storage area, this shall be done by direct spraying of steam or water vapour. Where room humidity is critical, appropriate monitoring shall be carried out.

G.3.9.2.3 The air-conditioning system shall be so designed as to prevent the distribution of products of combustion in the event of a fire.

G.3.9.3 Heating

G.3.9.3.1 Where heating is required to ensure product integrity, it shall be so designed as to ensure that the temperature in the warehouse does not fall below 5 °C. Heating systems should preferably be based on hot water or steam. The heat source, pipes, radiators, etc. that are likely to become hot shall be so positioned as to prevent direct heating of the stored product.

G.3.9.3.2 Facilities for the heating of a circulation medium shall be located outside the storage area or in a separate room. Any insulation material to be used shall be non-combustible, for example mineral wool or glass fibre.

G.3.9.3.3 Direct electrical room-heating equipment, and portable gas-fired room heaters, shall not be used in areas where flammable materials are stored.

G.3.10 Lighting

G.3.10.1 Where warehousing operations are only carried out during daytime and natural lighting provides a sufficient level of illumination to ensure compliance with the regulations, artificial lighting need not be installed.

G.3.10.2 Warehouses and material handling areas shall have illumination with a luminance value of 150 lx, and issuing counters shall have illumination with a luminance value of 200 lx.

G.3.10.3 Artificial lighting shall be such that undue warming of stored products is avoided. Lights shall be located above entrances and aisles, and not above product stacks.

G.3.10.4 Wiring for electric lighting and the necessary certificate(s) of compliance shall be obtained.

G.3.10.5 Electric switches shall not be installed inside a warehouse used for flammable products. Main switches shall be positioned outside the warehouse and shall be protected against the weather.

G.3.10.6 Subject to the provisions of G.3.10.1, emergency lights shall be placed at strategic positions along escape routes. Each light shall have an independent emergency power supply, such as a battery, which shall be kept fully charged during normal operations. Emergency lighting shall be so arranged that failure of the main supply will automatically switch on the emergency lighting.

G.3.11 Electrical equipment and installations, other than for lighting

G.3.11.1 Only the electrical facilities that are absolutely vital for the operation of a warehouse shall be located in the warehouse.

G.3.11.2 A separate electrical switch room shall be constructed. It shall be located against an outer wall of the warehouse building and shall be separated from the storage area by walls that provide a fire resistance of 120 min. A drainage system shall prevent the entry of water into the switch room. The door(s) that permit entry to the electrical switch room shall not open directly into the stock warehouse.

The main power line into the electrical switch room shall not pass through the storage area; it shall be laid either along the outside of the building or in the earth and encased in concrete. Switching to back-up or emergency power supplies, such as battery back-up supplies for alarm systems, or to independent default lines or power generators, shall be done either in the switch room or in a safe area well away from the storage areas.

G.3.11.3 Electrical equipment other than that for permanent lighting, such as power points, power tools or hand lights, shall not be installed in a warehouse that is used for flammable pesticides.

G.3.11.4 Operating procedures shall provide for the isolation of non-essential electrical equipment during periods when the warehouse is unmanned.

G.3.11.5 Battery charging facilities for electrically operated forklift trucks should preferably be in an open-sided, covered area within the marshalling area. Alternatively, the room or area shall be well ventilated at all times and shall not be accessible directly from the warehouse. The vents in such a room or area shall be as high as possible in the walls to prevent the accumulation of hydrogen gas.

G.3.12 Racks, shelving and warehouse storage technology

Pesticides shall not be stored directly on the floor. Adequate racks and shelves shall be provided for small packages, but, in general, provision shall be made to store goods on pallets or in standardized storage containers so that, especially in the case of larger warehouses, they can easily be handled by forklift trucks. Racks and shelves shall be non-combustible. The warehouse storage technology to be installed will depend

on the quantities and types of pesticides to be stored, the scale of the warehousing operation, the turnover rate, and logistical and economic factors.

G.3.13 Means of impeding the progress of a fire

G.3.13.1 Equipment such as fire shutters and draught curtains shall be installed as necessary and as recommended by the local fire authority. Where the design of the building necessitates it, a fireman's lift shall be installed.

G.3.13.2 Fire compartments and the limitation of the number of storage units in a compartment are ways in which the risk of the spreading of fire through a warehouse can be reduced. Fire compartments shall be separated from the main building by fire-resistant walls and ceilings, reinforced on both sides of the firewall. The firewalls shall extend beyond the building by at least500 mm. Each compartment shall be provided with a sprinkler system.

G.4 Storage facilities for flammable substances

G.4.1 Storage facilities for flammable liquids

G.4.1.1 Flammable liquids shall be stored in a separate area or room of the warehouse, and shall be enclosed with a material that has a fire resistance of 120 min from any room, cabinet or enclosure.

G.4.1.2 The floor of the storage area shall be constructed in such a way that, in the case of spillage, a volume equal to the quantity of the flammable liquid ordinarily kept in the store, plus10 % of that quantity, can be contained.

G.4.1.3 The flammable liquids store shall be ventilated to the open air in such a manner that vapour cannot accumulate inside the store.

G.4.1.4 The flammable liquids store shall be clearly marked with the flammable liquid hazard class diamond (see table D.1) and the applicable symbolic safety signs in accordance with US ISO 7010.

The type and amount of flammable liquid stored shall also be indicated at the entrance to the store.

G.4.1.5 An adequate amount of fire fighting equipment shall be installed as recommended by the local fire authority (see annex F).

G.4.2 Storage facilities for flammable solids

G.4.2.1 Flammable non-toxic solids shall be segregated from

a) flammable toxic liquids, and

b) non-flammable toxic liquids.

G.4.2.2 Flammable toxic solids shall be segregated from non-flammable toxic liquids.

G.4.2.3 Flammable toxic solids shall be stored in a separate area or room of the warehouse that shall be clearly marked with both the flammable solid hazard class diamond and the toxic hazard class diamond (see table D.1), and with the symbolic safety signs in accordance with US ISO 7010.

G.4.2.4 An adequate amount of fire fighting equipment shall be installed as recommended by the local fire authority (see annex F).

G.5 Warehouse management

G.5.1 Warehouse controller

The manager of a warehouse shall appoint a warehouse controller. The responsibilities of the warehouse controller, stipulated in writing, shall be to ensure that :

a) all safety, operating and emergency procedures are adhered to,

b) stock records are kept up to date and are readily available,

c) hazard and risk areas are clearly marked,

d) workers are trained in all operations, and in particular in the safe handling of pesticides, and

e) pesticides are stacked in accordance with the relevant requirements of G.6.

G.5.2 Security

G.5.2.1 Only the warehouse controller and those appointed by him shall have access to the warehouse. An appropriate entry-pass system shall be implemented.

G.5.2.2 Outside normal working hours, all doors and windows shall be locked unless they are required to remain open for ventilation.

G.5.2.3 If a warehouse is part of a larger complex of buildings, or stands in its own grounds, the perimeter of the property shall be protected by means of a wall or a fence of height at least 2,5 m that has, preferably, at least two strands of electric wiring, or a coil of razor wire, or similar protection, on top. The warehouse building itself shall be burglar-proofed as necessary.

G.5.2.4 The number of gates in the perimeter wall or fence shall be the minimum necessary to allow normal operations, except that, if possible, emergency service vehicles shall be able to gain access to the warehouse from at least two sides.

G.5.2.5 Names and contact telephone numbers of persons to be called in an emergency shall be given to security personnel, the local police and the local fire authority. A system shall be in place to ensure that the persons called have access to the keys of the warehouse. All keys shall be labelled.

G.5.2.6 If the warehouse is situated in a relatively heavily populated or environmentally sensitive area, and if the scale of operations permits, 24-hour manning of the security function, with regular patrols, shall be carried out. In such a case, a procedure shall be instituted to verify that patrols actually take place, especially at night.

G.5.3 Receipt and dispatch

G.5.3.1 A warehouse shall have separate loading and unloading bays to facilitate safe, efficient and secure receipt and dispatch.

G.5.3.2 (A) person(s) trained in all aspects related to the loading and unloading of dangerous goods shall be present while loading or unloading is in progress.

G.5.3.3 All goods received shall be checked against the relevant invoice, delivery note, bill of lading or manifest, and any discrepancies shall be dealt with in a safe and responsible manner.

G.5.3.4 No pesticides shall be accepted for storage if MSDSs for the goods have not been provided by the supplier of the goods.

G.5.3.5 During receipt and prior to dispatch, the person in charge of these functions shall ensure that the :

a) packaging, marking and labelling provisions as relevant, have been complied with,

b) vehicle to be used for transport is in a clean condition and in proper working order, and

c) appropriate action is taken in the event of non-compliance.

G.5.3.6 Care shall be taken during receipt and dispatch operations to ensure that incompatible pesticides are not allowed to come into contact with one another. A system shall exist that prevents the uncontrolled or indiscriminate simultaneous loading and unloading, in one place, of more than one vehicle at a time.

G.5.4 Segregation and separation

G.5.4.1 Owing to the potentially hazardous nature of pesticides, they shall not be stored in the same warehouse with food products, animal feeds or other materials such as clothing, tobacco and cosmetics.

G.5.4.2 The general principles to be applied in product separation and segregation shall be based on a detailed knowledge of the properties of, and the hazards associated with, the pesticides to be stored. US 1792-1 classifications and MSDS information are of vital importance in this regard.

The following general provisions shall apply in all cases:

a) flammable pesticides will greatly increase the risk of a toxicant fire if stored in the same area as toxic pesticides. If non-toxic themselves, flammable pesticides will normally not contaminate fire fighting water; and

b) flammable non-toxic pesticides and non-flammable pesticides shall be separated from flammable pesticides and aerosols. Flammable pesticides shall be segregated from oxidizing substances and corrosives.

NOTE See G.4 with regard to the storage of flammable substances.

G.5.5 Hygiene and personal safety

G.5.5.1 Housekeeping

G.5.5.1.1 Smoking and the consumption of food and drink in a warehouse shall be prohibited. Suitable signs to this effect in accordance with SANS 1186-1 shall be displayed. (A) separate tea room(s) or eating-place(s) shall be available on the premises.

G.5.5.1.2 Adequate washing facilities shall be provided, in accordance with the requirements of clause 8.

G.5.5.2 Personal protective clothing and equipment

Personal protective clothing and equipment that comply with the requirements of clause 7 shall be provided.

G.5.6 Operations prohibited within a warehouse. The following operations shall be prohibited in a warehouse:

a) repacking or refilling (or both);

b) vehicle maintenance; and

c) overnight garaging of any vehicles or motorized equipment, including forklift trucks.

G.5.7 Work procedures for high risk activities For high-risk activities (for example welding and cutting), a formal procedure shall be established for the handover of responsibilities from the warehouse controller to the outside contractor undertaking the work.

G.6 Warehouse storage systems

G.6.1 General

G.6.1.1 The use of standardized storage units is essential if safe and economical storage is to be achieved. For this reason, the variety of storage unit types and sizes shall be kept as small as possible.

G.6.1.2 The simplest storage unit is the storage container, which permits trouble-free handling and storage, owing to its set dimensions and design. The most frequently used storage unit, however, remains the wooden pallet.

G.6.1.3 The choice of the warehouse system to be used depends on logistical and economic criteria, in addition to safety requirements. The following warehouse storage systems are used:

a) block storage without racks;

b) block storage with drive-in racks;

c) block storage with through-racks;

d) rack storage with movable racks;

e) rack storage that uses normal forklift trucks;

f) narrow-aisle rack storage; and

g) high-rack storage.

G.6.2 Block storage without racks

G.6.2.1 Block storage without racks is suitable for small product ranges where there are large quantities per product and a high turnover rate. It requires that there be no necessity for access to a specific storage unit.

G.6.2.2 The storage units are stacked on the floor in double rows, and inspection corridors are kept free between each set of two rows. A space of at least 800 mm shall be left between stacks and exterior or partition walls. Inspection corridors shall be of width at least 500 mm, and no row shall exceed 20 storage units in length.

G.6.2.3 A maximum of three storage units may be stacked vertically; this provision may be relaxed when the height of the storage units is less than 1 m and the stack is robust.

G.6.2.4 Block storage without racks is of low cost in terms of equipment and infrastructure. However, it is difficult to detect leaks, disturbances to packaging, and fire in this type of storage system.

G.6.3 Block storage with drive-in racks

G.6.3.1 Block storage with drive-in racks can be used for products of all storage classes.

G.6.3.2 Block storage with drive-in racks consists of a permanent framework that has continuous supports for individual pallets or containers. The centre-to-centre horizontal distance between two adjacent racks shall be approximately 1 550 mm. The rack width, normally 1 200 mm, shall be such as to accommodate the storage units, and the depth of each rack shall exceed that of the pallets or containers by at least 50 mm.

G.6.3.3 An advantage of the drive-in rack design is that the height of storage is limited only by the lifting height of the forklift trucks used. Other advantages include the following:

a) reduced damage to storage units caused by stacking;

b) reduced danger of product damage, leakage or spillage; and

c) the ability to install fire alarms or fire fighting facilities to allow in-rack sprinkling.

G.6.3.4 Block storage of this type has a high infrastructure cost compared to that of normal block storage, but demands less warehouse space.

G.6.4 Block storage with through-racks

G.6.4.1 The design of block storage with through-racks is similar to that of the drive-in racks, but the solid support is replaced with transport mechanisms such as conveyer rails, sloping or motor driven roller conveyers, chain drives and conveyer belts. Loading and removal of products can be carried out manually, by forklift truck, or by means of automatic handling equipment.

G.6.4.2 This type of warehouse storage system can be adapted to a wide variety of storage unit dimensions, from aerosols and fibreboard boxes to pallets. It is logistically suited to the storage of a limited product range, with large quantities per product type and a high turnover rate. It requires that there be no necessity for access to a specific storage unit and, provided that appropriate safety facilities are installed, may be used for all storage classes.

G.6.4.3 An aisle of width at least 500 mm shall be provided after every second line of racks for maintenance and inspection purposes.

G.6.4.4 Block storage of this type has the highest capital installation cost per storage place, and for this reason is only used in practice for applications such as buffer storage

a) immediately following a continuous filling or packing line,

b) before high-speed commissioning, and

c) before shipping preparation.

G.6.5 Rack storage with movable racks

G.6.5.1 Rack storage with movable racks consists of racks on movable bases. The rack units are congregated to form blocks. The length of a movable rack unit shall not exceed 30 m. Loading and removal can be carried out manually or by forklift truck, depending on the storage units.

G.6.5.2 Movable-rack storage technology offers the highest level of utilization of the building volume, and is suitable for the storage of medium-sized product ranges with a limited turnover rate, in warehouses where access to each individual storage unit is necessary.

G.6.5.3 The high storage density achievable with this system hinders the detection of fires. Fire alarms and fire fighting facilities in large warehouses that use this technology shall be so installed as to allow in-rack fire detection and sprinkling of all storage positions. A fire protection mechanism shall be installed that drives all movable racks apart by at least 500 mm in the event of a fire alarm or when activated manually, for example at the close of business each day.

G.6.5.4 The capital costs for this storage type are high but can be offset by the high degree of space utilization, especially when special climatic conditions such as product conditioning are required. cooling or air

G.6.6 Rack storage that uses forklift trucks

G.6.6.1 Rack storage that uses forklift trucks consists of rows of racks separated by intermediate aisles. The dimensions of the rack spaces depend on the storage units used.

G.6.6.2 Rack lengths shall not exceed 50 m in cases where the rack is accessible from both sides, and 30 m where access is from one side. The storage height is limited by the maximum lifting height of the forklift truck. The width of the aisles depends on the design of the forklift truck and can vary between 2,8 m and 4,2 m.

G.6.6.3 A rack storage system that uses forklift trucks is suited to the storage of large product ranges with a moderate turnover rate in small-to-medium-sized warehouses, where access to each individual storage unit is necessary.

G.6.6.4 Fire detection and fire fighting are simplified by the generous space arrangement necessitated by the use of forklift trucks. The use of separating elements, together with fusible bolts for attaching the racks, can reduce the potential hazard of a fire in one section of the warehouse breaking through to the next section.

G.6.6.5 Capital investment in racks and forklift trucks is relatively low in view of their useful lifetimes. However, savings in this area could be offset by the cost of the required storage space.

G.6.7 Narrow-aisle rack storage

G.6.7.1 For narrow-aisle rack storage, special forklift trucks that have swivelling forks, telescoping forks or a swivelling mast are used. Some of the forklift trucks used are capable of operating automatically or semi-automatically; no person shall therefore be allowed to enter the rack aisle during operations.

G.6.7.2 The width of an aisle varies from 1,7 m to 1,9 m depending on the dimensions of the storage units. The useful storage height depends on the type of forklift truck used. Special forklift trucks have been developed that have a maximum lifting height of 12 m, which gives a useful storage height of approximately 14 m.

G.6.7.3 Narrow-aisle rack storage is suitable for large product ranges with a moderate turnover rate in large warehouses, where access to each individual storage unit is necessary.

G.6.7.4 The high capital costs of the racks and the specialized forklift trucks are generally offset by the high level of utilization of the building volume.

G.6.8 High-rack storage

G.6.8.1 The high-rack storage system is operated by means of a fully automatic rack server that runs on rails. Lines of racks, up to 150 m long and 45 m high, are located on both sides of the aisle along which the automatic rack server runs. The dimensions of the racks and rack spaces depend on the storage units, and are critical to the effective automatic running of the system. The aisle is normally 100 mm wider than the widest storage unit.

G.6.8.2 High-rack storage technology offers a very high level of utilization of the building volume. It is therefore suitable for the storage of large product ranges with a high turnover rate in large warehouses, where access to each individual storage unit is necessary. In relation to the volume stored, the floor space demanded is small.

G.6.8.3 Automatic fire fighting facilities shall be installed and the automatic rack server shall be equipped with controls that "park" the system in the event of fire.

G.6.8.4 High-rack storage is a high-capital-cost solution to storage problems. However, the high level of utilization of the building volume can offset these costs. This system is likely to be economical only when the warehouse turnover rate is very high and the rest of the warehousing and marshalling operations are characterized by a high degree of order.

G.7 Forklift trucks

G.7.1 Forklift trucks driven by petrol engines or by low petroleum gas (LPG) engines shall not be used in a warehouse where pesticides are stored.

G.7.2 A forklift truck with a capacity of 750 kg or more shall only be operated by an operator in possession of a certificate issued by an organization approved for this purpose by the relevant national authority (see foreword).

G.7.3 A maintenance register for each forklift truck shall be kept and shall be available for inspection.

G.7.4 A carbon dioxide type fire extinguisher (see US ISO 7159 and US ISO 11602-2) shall be fitted onto each forklift truck.

G.8 First aid

G.8.1 Basic first-aid requirements and the items required for a first-aid kit are given in annex B.

G.8.2 An employer shall provide a first-aid kit at, or near, an area where more than five operators are working. The first-aid kit shall be readily available and accessible.

G.8.3 Where more than 10 people are employed, and for every group of 50 operators, at least one person shall be trained in first aid and shall be readily available during normal working hours. Such (a) person(s) shall be in possession of a valid first-aid certificate issued by an organization approved for this purpose by the relevant national authority (see foreword).

G.8.4 Eyewash bottles and safety shower facilities shall be available in different areas of the warehouse in case of accidental exposure of (an) operator(s) to (a) pesticide(s). The MSDSs of the pesticides stored shall be readily available at a central location for reference to the actions to be taken in the event of an incident.

G.9 Fire protection, emergency planning and emergency training

G.9.1 Fire protection

G.9.1.1 General

The requirements of clause 14 and annex F shall be complied with.

G.9.1.2 Sprinkler systems

G.9.1.2.1 A sprinkler system is most effective in racked storage facilities. Sprinklers shall always be installed if the storage racks are more than 6 m high. The following shall form part of the sprinkler system of a warehouse:

a) bulk water tanks;

b) a jockey pump, an electrical pump and a diesel pump that can be coupled to a pressure-sensitive control system; and

c) in-line rack sprinklers.

G.9.1.2.2 A warehouse in which any of the following storage limits are exceeded shall be equipped with a sprinkler system in addition to portable or mobile fire extinguishers

G.9.1.2.3 Despite the provisions of G.9.1.2.2, the authority administering this standard may, after due consideration of the exposure risk and available water and distinguishing media supplies, relax some of the provisions, or, alternatively, prescribe such additional provisions as are deemed necessary. Furthermore, a sprinkler system may be prescribed for a warehouse that stores smaller quantities of such materials after other risk factors have been taken into account.

G.9.1.3 Fire detection and fire alarm systems

G.9.1.3.1 Depending on the risk profile of the warehouse, the local fire authority could require that the premises be equipped with an internally audible alarm system.

G.9.1.3.2 Various alarm systems can be installed:

a) a push-button and break-glass unit;

b) a smoke-and-heat detector system;

c) a pressure-sensitive system coupled to the sprinkler system; or

d) an automatic system with a direct link to the local fire authority by telephone line or radio connection.

G.9.2 Emergency planning

G.9.2.1 The health and safety representative(s) or the health and safety committee of the warehouse shall develop an on-site emergency plan in consultation with the local emergency services. Any risks related to the health and safety of the public in the event of an incident shall be taken into consideration.

G.9.2.2 The on-site emergency plan shall be updated at least once every three years in consultation with the local emergency services. A copy of the emergency plan shall be signed by the warehouse controller in the presence of two witnesses, who shall attest the signature.

G.9.2.3 All operators shall be conversant with the on-site emergency plan, and it shall be readily available at all times for implementation and use.

G.9.2.4 The on-site emergency plan shall be tested (by means of an emergency exercise) at least once a year, and a record shall be kept of each such emergency exercise.

G.9.3 Emergency training

G.9.3.1 All operators shall be trained in the use of the different types of fire extinguishers on site, and shall practise their duties as set out under the emergency plan.

G.9.3.2 The emergency training shall include

a) initiation of the alarm,

b) correct use of the fire fighting equipment,

c) evacuation procedures,

d) roll calls, and

e) fire drills.

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