

TECHNICAL NOTE

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SUMMARY

This Technical Note outlines legislation governing pesticide use and sets out training and certification requirements relevant to pesticide storage. It provides recommendations on planning, constructing and maintaining permanent and mobile pesticide stores and gives guidance on the management and safe storage of pesticides. Advice is also given on waste disposal, health and safety issues and emergency planning.

INTRODUCTION

The storage of pesticides is strictly controlled by the legislation contained in Part III of the Food and Environment Protection Act (FEPA) 1985. In addition, the Control of Pesticides (Amendment) Regulations (COPR) 1997 require that the storage of pesticides is subject to all reasonable precautions being taken to protect people, animals, plants and the environment.

The forest industry must be able to demonstrate to regulators such as the Health and Safety Executive (HSE) that it complies with current legislation. It must also conform to the requirements of the British Agrochemical Standards Inspection Scheme (BASIS), an independent registration, standards and certification scheme set up by Government to establish and assess standards in the pesticide industry relating to storage, transport and competence of staff.

This Technical Note outlines the responsibilities of owners and managers of pesticide stores under the current regulations and gives guidance on standards for pesticide storage facilities. The Note also provides information and extracts from the *Code of practice for using plant protection products** (Defra, 2006), the *Code of practice for suppliers of pesticides to agriculture, horticulture and forestry* (commonly referred to as the 'Yellow code') (MAFF, 1998), and the Agricultural Information Sheet AIS16 *Guidance on storing pesticides for farmers and other professional users* (HSE, 2003). More information on relevant legislation and sources of guidance is given in References and Useful Sources of Information (page 7).

*Applies in England and Wales – a Scottish version of the Code is in preparation.

TRAINING AND CERTIFICATION

The NPTC (National Proficiency Tests Council) specialises in training related to agricultural and other land-based activities. Although it does not provide a specific training course on pesticide stores, basic store criteria and management are described in the foundation module PA1: *Certificate of competence in the safe use of pesticides* and in other pesticide applicator modules.

BASIS Registration Ltd also provide training leading to a *Certificate of competence in the storage and handling of crop protection products* (the Storekeeper's Certificate) which covers the storage of pesticides approved for agricultural (and forestry) use. The Certificate is awarded to an individual storekeeper, not the store, but it does not entitle the holder to advise, recommend or otherwise be involved in the sale or supply of pesticides.

A BASIS Storekeeper's Certificate is a requirement for stores holding over 200 kg or 200 l of pesticide (or equivalent combinations), where the pesticides are stored 'for sale or supply' – including supply of pesticides to contractors. A Certificate is not required when less than 200 kg or 200 l of pesticide (or equivalent combinations) are stored and used by an organisation's own employees.

PLANNING AND CONSTRUCTING PESTICIDE STORES

A pesticide store may be a purpose-built, stand-alone structure, an area within a building or a small prefabricated unit – including suitable chests, bins, vaults, or vehicles.

Figure 1 shows a typical purpose-built pesticide store.

Figure 1 A typical purpose-built pesticide store.



In all cases, pesticide stores should be:

- suitably sited;
- provided with suitable access for loading/unloading and emergencies;
- soundly constructed from fire-resistant materials;
- capable of containing spillage and leakage;
- dry and frost free;
- well lit and ventilated;
- marked with appropriate warning signs and secure against theft and vandalism;
- staffed, equipped and organised to accommodate intended contents;
- separate from storage for pesticide applicators, personal protective equipment and washing facilities.

Planning

Plans for new pesticide stores or the redesign of existing stores must involve consultation with the following authorities:

- Local office of the Environment Agency (EA) in England and Wales, or the Scottish Environmental Protection Agency (SEPA) and Scottish Water in

Scotland.

- Local fire authority.
- Local authority planning and building control department.
- Local authority environmental health department.
- Police crime prevention officer.

Advice on planning is also available from the HSE.

Once the store has been built or commissioned, the local EA or SEPA pollution prevention officer and the fire prevention officer must be notified in writing of its existence and location. All stores should hold the written approval of both authorities.

Siting

Pesticide stores must be sited away from areas that are at risk from fire and must be at least 4 m away from domestic dwellings, potential sources of ignition, and combustible materials such as diesel, oils and wood stacks. Stores must not be sited close to drains, watercourses, wells and boreholes or areas liable to flooding.

Access for loading and unloading

Areas used for the loading and unloading of pesticides should be impermeable. They should also have a spillage containment kit to reduce environmental pollution if a spill occurs. New stores should be designed with access for the emergency services to all sides of the building.

Construction

The requirements for the construction components of pesticide stores, including walls, roofing, doors, floors, bunding, drains, water supply, ventilation, lighting, electrical installations and shelving, are as follows.

Walls

The walls enclosing the store should be impermeable to pesticides at least to the height of any bunding designed to prevent leakage. Interior surfaces should be smooth and capable of being easily cleaned. Internal walls (of at least 30 minutes fire resistance should extend to the roof). In addition, where a suspended ceiling is fitted this should also have a 30 minute fire resistance. Advice should be sought from the local fire authority.

Roofing

In single-storey stores, the roof should either incorporate translucent panels (expected to fail and vent smoke from store) or proprietary smoke vents to facilitate the dispersal of heat and smoke from a fire.

Doors

Doors should be high and wide enough to accommodate the handling system. Doors and frames in fire-resistant walls should be capable of providing a minimum of 30 minutes fire resistance and should also have a self-closing mechanism. Bunding should be continuous across all openings, including emergency exits.

Floors

Floors should be impermeable, non-slip, easily cleaned and resistant to chemicals. A wooden or untreated concrete floor is unlikely to be suitable.

Bunding

To prevent contamination of watercourses, drainage systems or adjacent land, pesticide stores should be designed and constructed to provide containment of any spillage, leakage or contaminated water, e.g. in the event of a fire.

Containment of leaks and spillages should be achieved by bunding. For a typical pesticide store, the bund will comprise an impermeable floor and impermeable sides which should reach the height of the door sill.)

The bund should be soundly constructed from non-fragile materials that are resistant to permeation by liquids, e.g. metal (not foil), concrete, bricks, stone slabs and concrete products. Rendering or sealing the building materials may be necessary, especially at joints. The bund should extend around the whole periphery of the store, and should not be compromised by, for example, entrances and exits or other apertures where services enter the store.

The store, or the area in which the store is located, should be able to retain leakage/spillage to a volume of 110% of the total quantity of products likely to be stored (185% if sited in an environmentally sensitive area).

Drains

Stores must not have internal drains that connect to main drainage systems, empty into a watercourse or soak away on to land. Any external tanks or sumps to contain drainage from a store should be impermeable. Disposal of this water should be carried out by a specialist waste disposal contractor.

Water supply

A water supply is needed for fire fighting. Advice on the amount and suitability of water in a pesticide store should be sought from the fire and environmental authorities.

Ventilation

To prevent the build up of vapours, adequate ventilation

at both low and high level should be provided by either louvres or air bricks, sited at a level above the containment bunding to prevent the escape of pesticide in the event of an overflow. Extractor fans should be installed if natural ventilation cannot be provided or is not sufficiently effective.

Lighting

The store must have sufficient natural or artificial light to allow easy identification of labels and to aid other work within the store. Average levels of light should exceed 100 lux, which is the equivalent of a normally lit office. Any glass windows must be opaque and toughened to prevent entry. Other types of window must be secure and shaded, or built into the north-facing wall, as ultraviolet light causes deterioration of containers. To prevent heat transfer to stored products, space must be left between sources of artificial light and the top-stored products.

Electrical installations

Pesticides are likely to suffer deterioration by frost. The store should be provided with a black heat and frost thermostat. If the stored products are flammable, the installations may have to meet additional building standards.

Shelving

Shelving must be sufficiently strong to support the pesticides and should be of corrosion-resistant, impermeable materials which allow for circulation of air and easy cleaning. They should not be slatted. Wood is generally unsuitable for shelving as it absorbs chemicals. The arrangement should allow easy segregation of different chemicals, ease of stock rotation and have sufficient capacity to store all chemicals in an orderly fashion. Where flammable and highly flammable chemicals are stored, separate areas will need to be provided within the store.

Signage

A stand-alone permanent store should have a sufficiently large and clear 'general danger' warning sign (Figure 2) which must be conspicuously displayed outside the store. If the pesticide store is part of a larger building complex, the general danger warning sign must be fixed to the part of the building where the store is situated. In both cases, the sign should be fixed 1.7–2 m above the ground at the store entrance. It may be accompanied by the words 'CHEMICAL STORE'.

'No smoking' or 'Naked flames forbidden' (Figures 3a and 3b) signs must be prominently displayed at the entrances.

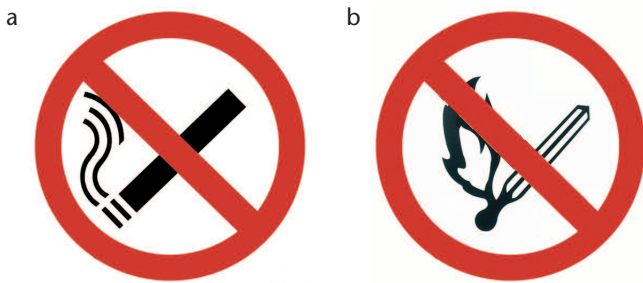
Figure 2

A general danger warning sign. The sign may be accompanied by the words 'Chemical Store'.



Figure 3

(a) No smoking sign; (b) Naked flames forbidden sign.



If the outside door opens directly into the store these signs must be displayed on the exterior wall of the store. If the outside door does not lead directly into the pesticide store the signs can be displayed within the building, but before the entrance to the store.

Fire prevention

Smoking or the use of naked lights, flames or other heat sources must be prohibited within the store. Fire alarms and emergency fire-fighting equipment should be installed and maintained as recommended by the fire authority. A fire risk assessment should be completed the storekeeper.

Security

Stores should be locked securely outside business hours or when not staffed. Access should be to authorised staff only. Further advice on security should be obtained from the local police crime prevention officer.

Standards and maintenance

Standards of storage facilities should be maintained by regular (at least annual) checking and by having

appropriately qualified staff. An independent expert should carry out an annual store check and any problems identified should be rectified immediately. HSE inspectors may also carry out unannounced checks on pesticide stores, and storekeepers should be aware that HSE inspectors are prepared to prosecute without prior warning when serious contraventions are discovered.

MANAGING PESTICIDE STORES

Pesticide stores must be managed by an identified individual who has sole responsibility for pesticide storage matters. This person must be BASIS qualified, where appropriate, and their record of training safely archived.

Record keeping

A list of store contents should be kept updated at all times. Accurate record keeping ensures that the contents of a store can be readily identified at any time. This is important in the event of an accident, so that accurate information can be given to the emergency services. One set of up-to-date and complete records must be kept in a location separate from the pesticide store.

Office and store records must include:

- a list of quantities and types of pesticides stored;
- the date of manufacture of pesticides and date of delivery;
- details of movements of stock in and out of the store;
- details of how and where pesticides with specific hazards (e.g. flammables) are stored.

Stock control

A system of stock rotation should be used to minimise storage time and avoid deterioration of products and their containers. A 'first in, first out' policy should be adopted. Recording the date of entry to the store on the outward facing side of the containers is a useful technique to ensure good stock management.

Container stacking

Containers should only be stacked to a height within safe working reach of either the authorised personnel or the mechanised system used. Storage on shelves allows easier identification of products and any containers developing leaks will be more obvious. Powders and granules should be stored above liquids as the latter can leak more readily if containers are damaged.

Specialised storage

Some pesticides require extra storage precautions within a standard pesticide store, for example:

- **Gassing powders and fumigation tablets.** Pesticides such as sodium cyanide and aluminium or zinc phosphide should be stored above bund height in a separate, moisture-proof, fire-proof chest, bin or vault. The container should be kept locked and clearly marked 'Gassing compound – Do not Use Water'.

For further advice see *Fumigation: health and safety guidance for employers and technicians carrying out fumigation operations* (HSE, 2005) and Agriculture information sheet 22 *Gassing of rabbits and vertebrate pests* (HSE, 1996).

- **Flammable pesticides and liquefied petroleum gases.** Pesticides labelled 'flammable' (flash point of between 21°C and 61°C) or 'highly flammable' (flash point below 21°C) should be stored following the advice of the local fire authority or HSE. This may involve isolated storage within a defined section of the store in a fire-resistant structure away from heat and electrical sources.

For small quantities of flammable or highly flammable pesticides, the separate section can be a fire-resistant cupboard or bin within the store. The exterior of this should be marked with a 'flammable material' warning sign (Figure 4). Larger quantities should be stored in an area formed by a suitably fire-resistant partition and roof within the store or in a separate pesticide store.

'No smoking' and 'Naked flames forbidden' signs (Figure 3) should be attached to the exterior door of the store. Wherever flammable pesticides are stored, either alone or with non-flammables, the area should be clearly marked with a 'flammable material' warning sign.

Figure 4

Flammable material warning sign.



Further advice on storage of flammable pesticides is available from the local fire prevention officer and Health and Safety Guidance *Storage of flammable liquids in containers* (HSE, 1998) and *The storage of packaged dangerous substances* (HSE, 1998).

TRANSPORTATION AND MOBILE STORES

The following guidance applies to temporary storage, usually for less than 24 hours, in vehicles, bowsers and sprayers stocked from a permanent pesticide store or retail outlet. Pesticides should never be carried in the cabs of tractors or other vehicles.

To ensure that pesticides can be safely transported to, and stored at, the site of application, the following key points must be followed:

- The vehicle must have a floor-to-ceiling bulkhead between the driver/passenger compartment and the load compartment. Pesticide containers must be securely stored within a portable store that can be mounted to the vehicle during transport.
- If the vehicle has no bulkhead, pesticide containers must be securely stored and transported within a portable store that can be mounted on the exterior of the vehicle or on a trailer during transport.
- The load carrying area must be free from projections that might damage containers and must be marked with the 'general danger' warning sign shown in Figure 2.

Pesticides that are being stored temporarily in a mobile unit should always be secured against unauthorised access.

- The mobile store must be parked away from any location where water could be polluted in the event of a leak or spill of pesticide.
- The mobile store should be within sight of the work area – especially in areas where there is public access.
- Unattended store cabinets or vehicles must be locked.

At the end of the job:

- All unused pesticides must be returned to the permanent store.
- Lids or caps on any part-used products must be secured before the journey back to the permanent store.
- All empty containers, packaging and other equipment must be taken back to the permanent store.

WASTE AND WASTE DISPOSAL

Pesticide concentrates, containers that contain pesticide residues, contaminated rinsings, the contents of bunds and holding tanks and contaminated protective clothing are classed as special waste and disposal must be carried out by an appropriately licensed contractor. Responsibility remains with the producer even after collection, so it is recommended that competent contractors are selected. Other types of waste arising from pesticide stores is known as controlled waste and responsibility lies with the waste creator.

The EA in England and Wales and SEPA in Scotland can advise on waste disposal and can supply the names of suitable authorised waste disposal contractors. Further information is available in the Department of the Environment publication *Special waste regulations 1999*.

HEALTH AND SAFETY

Personal protective clothing

Personal protective clothing (PPE) must be stored separately but preferably adjacent to the pesticide store. The PPE store must be kept clean, dry, well-ventilated and secure. It should have separate areas for PPE and personal clothing.

PPE in storage will vary as it will be designed to be used with the products held in the store. It will generally include:

- face-shield;
- coverall;
- apron;
- boots;
- protective gloves.

When PPE becomes contaminated it should be removed and cleaned or disposed of as special waste.

Washing facilities

Washing facilities should be close to, but ideally separate from, the pesticide store and the PPE facilities if possible. All facilities should have a system to collect and store washings from PPE and equipment cleaning.

Food, drink and smoking

Under no circumstances should any food or drink be taken into or consumed within the store. Smoking is prohibited at all times.

EMERGENCY PLANNING

Staff responsible for the store should have an emergency plan in place in the event of spillages, fires or other emergencies such as vandalism. The maximum permitted threshold for any single pesticide in drinking water is one part per ten billion and regulatory authorities regard contamination, however slight, as a very serious matter.

The emergency plan should be written down and kept in a readily available place close to, but not in, the store. It should include:

- A detailed site plan of the store buildings and surrounding area.
- A detailed site plan of the water supply and drainage system, including details of foul and surface drainage and the location of any adjacent watercourses.
- The position of any drain bungs, gully covers, shut-off valves and sand bags.
- Measures to protect watercourses – which should include the operational procedures necessary to put the measures into practice.
- Contact details of emergency services and pollution prevention and control authorities (EA/SEPA).
- Names, addresses, telephone numbers of keyholders.

RECOMMENDATIONS

- Those responsible for managing pesticide stores should have a BASIS Storekeepers Certificate of Competence. They must have this Certificate if the store holds more than 200 kg or litres (quantity can be a combination of solids and liquids) and the pesticides are sold or supplied.
- All stores must comply with the basic criteria for planning, siting, construction and signage.
- Fire prevention and security require careful planning and checking.
- Maintenance of standards and accurate record keeping are important elements in good store management.
- Mobile stores require the same high standards of management as permanent stores, albeit on a more localised and smaller scale.
- Disposal of waste materials must be carried out by appropriately licensed contractors.
- PPE should be stored separately but where possible adjacent to the pesticide store.
- Washing facilities should also be close to the store.
- No food or drink should be taken into the store.
- An emergency plan should be drawn up by the store manager and kept close to, but not in, the store.

LEGISLATION

The legal aspects of pesticide storage are governed by FEPA, under which the first two sets of legislation also apply. The remaining 13 Acts and regulations are also relevant.

- The Control of Pesticide Regulations 1997(COPR).
- The Plant Protection Products (Basic Conditions) Regulations 1997.
- Dangerous Substances (Notification and Marking of Sites) Regulations 1990.
- Electricity at Work Regulations 1989.
- Environmental Protection (Duty of Care) Regulations 2003.
- Health and Safety (First Aid) Regulations 1981.
- Health and Safety (Safety Signs and Signals) Regulations 1996.
- Highly Flammable Liquids and Liquefied Petroleum Gases Regulations 1972.
- Personal Protective Equipment at Work Regulations 1992.
- Producer Responsibility Obligations (Packaging Waste) Regulations 2002.
- Poisons Act 1972.
- Poisons List Order 2002.
- Poisons Rules 1982.
- Special Waste Regulations 1996.
- The Control of Substances Hazardous to Health (COSHH) 2002.

REFERENCES AND USEFUL SOURCES OF INFORMATION

DEFRA (2006).
Code of practice for using plant protection products.
Defra, London.

[This code is also available on the PSD website at www.pesticides.gov.uk/farmers_growers_home.asp#Codes_of_Practice and on the Defra website at www.defra.gov.uk. A Scottish code is currently being produced and will be available from the Scottish Executive website]

DEPARTMENT OF THE ENVIRONMENT (1999).
Special waste regulations 1999.
The Stationery Office, London.

HEALTH AND SAFETY EXECUTIVE (1996).
Gassing of rabbits and vertebrate pests.
Agriculture Information Sheet AIS22.
HSE Books, London.

HEALTH AND SAFETY EXECUTIVE (1998).
Storage of flammable liquids in containers.
Health and Safety Guidance 51.
HSE Books, London.

HEALTH AND SAFETY EXECUTIVE (1998).
The storage of packaged dangerous substances.
Health and Safety Guidance 71.
HSE Books, London.

HEALTH AND SAFETY EXECUTIVE (2003).
Guidance on storing pesticides for farmers and other professional users.
Agriculture Information Sheet 16.
HSE Books, London.

HEALTH AND SAFETY EXECUTIVE (2005).
Fumigation: health and safety guidance for employers and technicians carrying out fumigation operations.
Health and Safety Guidance 251.
HSE Books, London.

MINISTRY OF AGRICULTURE, FISHERIES AND FOOD (1998).
Code of practice for suppliers of pesticides to agriculture, horticulture and forestry (Yellow code).
Ministry of Agriculture, Fisheries and Food, London.

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