

Guidelines for handling, storage and disposal of agrochemicals in the South African wine industry

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A Introduction

For many producers economically sustainable agriculture is not possible without the use of some agrochemicals, i.e. any agricultural remedy registered in terms of Act 36 of 1947, which includes herbicides, miticides, insecticides, nematicides and fungicides. However, Section 24 of the Bill of Rights within the Constitution of South Africa (Act 108 of 1996) determines that every person has the right to an environment which is not harmful to their health or well-being and that the environment is conserved for current and future generations. All users of agrochemicals therefore have a constitutional responsibility to ensure that they use these products in such a way as not to cause undue damage to the environment or jeopardise the health of workers and consumers.

The Scheme for Integrated Production of Wine (IPW) provides guidelines for sustainable, environment friendly viticulture. These include a system for rating or coding agrochemicals according to their potential environmental impact and a system that evaluates the relative environmental impact of each agrochemical application. The guidelines require farmers to monitor pest and disease occurrence before deciding whether or not to implement control measures and to use alternatives to chemical control wherever possible. If and when pesticides must be applied, products that have the least impact on the environment should be selected, based on their coding and method of application. A current list of all registered products that have been coded for use in sustainable viticulture is available on the IPW website (<http://www.ipw.co.za>). As far as the handling, storage and disposal of agrochemicals are concerned, IPW requires farmers to comply with all relevant South African legislation.

The handling, storage and disposal of agrochemicals on farms are governed by a

multitude of laws. Consequently, the SABS compiled a national standard, **SANS 10206**, which summarises all the relevant legal requirements. **These regulations apply to all types of farming** including grain crops, vegetables and animal production. The latest edition (2007) of SANS 10206 is available from any regional SABS office.

The purpose of this document is to provide users of agrochemicals within the South African wine industry with a handy guide to enable them to comply with all legal requirements regarding the handling, storage and disposal of agrochemicals on farms.

B Store for agrochemicals

Authorisation

- When a new store is being built, plans must be submitted to the relevant local authority. An occupancy certificate to certify that the structure complies with the National Building Regulations will be issued after the necessary inspection. For an existing store a sketch plan of the store must be submitted to the relevant local authority so that an inspection can be arranged and an occupancy certificate can be issued.

Location

- The chemical store must be situated above the 50 year flood line, but preferably above the 100 year flood line.
- It must be situated away from rivers, dams, boreholes and areas likely to be flooded.
- The store must not be in a location where it would be exposed to rock falls, falling trees and veld fires.
- The store should preferably be housed in a separate building, at least 5 m away from any other building. It must also be more than 10 m away from any house or livestock buildings, or buildings that contain feed, fodder or flammable material. Vegetation within 5 m of building should be cleared, as it could pose a fire hazard.

- If the store is part of a larger complex, it must be totally sealed off so that there is no free movement of air between the chemical store and the rest of the building. The store should also be separated from the rest of the complex by an approved firewall if flammable products are kept in the chemical store.
- The chemical store must be in a secure location where it can be supervised.
- It should be easily accessible for delivery, dispatch and more importantly, in the case of fire.

Construction

- The walls, roof and floor should be made of non-combustible materials – wooden Wendy-houses or wire-mesh enclosures are not acceptable. Materials that render the store frost and fire-resistant should be used in construction.
- Walls must be of brick or concrete.
- The roof must be leak-free and insulated with non-combustible material to maintain the temperature in the store at reasonable levels. Vents should be installed in the roof to allow hot air to escape.
- The floor must be of smooth (screeded) concrete and must not be slippery, even when wet. It must be impenetrable to spilt chemicals and should have watertight wall-to-floor joints. Cracked, disintegrating or unscreeded concrete floors, as well as soil, wood, bitumen, PVC or linoleum floors are not acceptable.
- Doors should preferably be made of steel with effective locks. The exit door(s) must open to the outside and have security gates to reduce the risk of forced entry. Security gates are absolutely necessary if the store has a wooden door.
- The store must be well-lit so that labels on the containers can be read easily. This could either be achieved by installing wired glass windows (minimum 8 mm thickness) with a maximum panel size of 450 x 450 mm or by installing electric light. Windows must have steel frames and burglar bars and should not be capable of being opened. Windows should be installed only to supply light, not ventilation.

- The store must be watertight, with a doorway that is banded (ridge or retention wall) to a height of 200 mm, to retain spillage and to keep out flood water. All joints in the floor should be sealed.
- The store must be well ventilated. Natural ventilation: airbricks with a minimum size of 140 x 215 mm and covered with non-corrodible gauze wire should be installed in at least three external walls to provide a minimum of five total air changes per hour. Mechanical ventilation systems must be switched on at all times and should have the capacity to change the total air content a minimum of five times per hour.
- In areas where lightning strikes are prevalent, appropriate measures should be taken in accordance with SANS 10123 to prevent the accumulation of electrostatic charges, or to discharge electrostatic charges under controlled circumstances.

Security

- Access to the store must be limited to the supervisor and personnel appointed by the supervisor. These people must have adequate training in the safe handling of pesticides. Warning signs indicating that unauthorized access is prohibited, should be placed at the entrance of the store. A wall or fence at least 1.8 m high, with a lockable gate and a clear strip along the inner perimeter must be erected to secure the area around the store against unauthorized entry.

Placement of products in store

- No foodstuffs or products other than plant protection and/or animal health products are allowed in the chemical store.
- Herbicides and phenoxy compounds must be separated from other pesticides by a division made of wire mesh or metal bars or a wall with a gate or door. This is to prevent accidental application of herbicides to crop foliage (GAP)¹.

¹ GAP = not a legal requirement, but recommended as a good agricultural practice to enhance safe handling, application and storage.

- All danger group I products (red label), in terms of SANS 10304-1, must be kept in a separate, fenced-off and lockable area within the store. A metal locker or a locker made of metal bars or galvanised diamond mesh can be used for this purpose.
- Flammable liquids should be stored in a separate, clearly marked room or enclosure in the store. The room or enclosure should be ventilated to the open air in such a manner that vapour cannot accumulate inside the store.
- Shelves must be resistant to the chemicals that are stored on them, i.e. they must be non-absorbent, impervious and chemically resistant to stored products. Wooden shelves should be covered with thick plastic or non-combustible trays must be used.
- Fibreboard boxes, fireboard drums and paper bags must not be stored directly on cement floors or be stacked against walls, as cement floors tend to sweat and could damage these containers.
- Large containers should not be stored directly on the cement floor, but rather be placed on wooden pallets covered with thick plastic or on plastic pallets that would make it easier to move when spillage occurs.
- Plastic and metal drums of 20 L capacity and more should not be stacked more than two tiers high as it could be difficult and/or dangerous to take them down.
- Powder and granular formulations must be stored above liquid products and not vice versa. This is to prevent major damage in case of accidental leakage of liquids.
- Open bags with powder formulations should preferably be kept in large plastic bins with lids to contain fumes, protect against contamination and prevent unnecessary spillage onto the floor (GAP)¹.
- All chemicals must be stored in their original packaging with their labels intact. Concentrate formulations may not be decanted into other containers.

¹ GAP = not a legal requirement, but recommended as a good agricultural practice to enhance safe handling and storage.

Working area

- A separate, bunded working area must be available with ample facilities for weighing, measuring and mixing of chemicals. Suitable and adequate measuring equipment must be provided, as well as a washbasin with running water and an eye wash bottle.
- Shower facilities with soap and a clean towel should be available in or near the working area so that spray operators can wash after spraying and also in case of accidental contamination when spillage occurs.

Spillage

- Spills and flooding should not contaminate water sources, crops, pastures or the general environment.
- All containers should regularly be inspected for leaks. Chemicals in damaged containers should be transferred to compatible, clean containers that should be labeled clearly. Large, open containers should be readily available for the removal of contaminated material and to place leaking containers in.
- A bucket with sand or any other suitable inorganic material that can absorb spillage or leakage should be available and easily accessible, together with suitable empty containers for contaminated material, spades, squeegee-mops and brooms.
- Contaminated water from fire or clean-up of spillage must be contained and disposed of by a professional hazardous waste disposal company. Alternatively, it can be disposed of in the evaporation pit constructed at the filling area.

Warning notices

- “Storage of Pesticides” and “Unauthorized Entry Prohibited” warning signs must be displayed at the entrance and on the surrounding fence of the store. Signs must be written in red letters (at least 75 mm high) on white background.
- Safety signs (e.g. no smoking, no eating or drinking, no open flames) should be displayed at the entrance and inside the store in accordance with the

requirements of SANS 1186-1. Signs must be at least 290 mm x 290 mm in size.

- All areas inside the store must be clearly demarcated and relevant signs (e.g. toxic, flammable, corrosive) displayed. Signs must be at least 250 mm x 250 mm in size.
- The location of First Aid Station and the position and types of fire related equipment should be clearly indicated.

Responsible persons

- The person responsible for managing the pesticide store (e.g. the farmer or a literate farm worker) must be trained in pesticide handling and understand the risks and implications of incorrect handling of the chemicals.
- The responsible person should check every container on delivery for correct content and to ensure that containers do not leak.
- Stock containers must be labeled in waterproof ink with the delivery date or the manufacturing date on the label should be used to ensure that the oldest stock is used first.

Emergency Procedure

- Emergency telephone numbers should be clearly displayed at the entrance and inside the store. This should include the nearest poison centre, doctor, hospital, fire brigade and ambulance service.
- Responsible personnel must have immediate access to a telephone and emergency numbers, even in the absence of the employer.
- Basic first aid must be taught to at least one farm worker handling and applying pesticides. Information on relevant first aid procedures for all pesticides (full label or Material Safety Data Sheet (MSDS)) in the store must be available in a prominent place. If all relevant safety and first aid information is available on the product label, it is not necessary for a MSDS to be supplied as well.
- Responsible personnel must be familiar with the emergency procedure which clearly outlines actions to be taken in an emergency. This procedure must be available at an easily accessible position in the store.

Fire fighting

- Portable fire extinguishers of minimum 9 kg capacity for the dry chemical type and foam type (as specified in SANS 1910), or 9 L for the carbon dioxide type (as specified in SANS 1567), should be installed within the store.
- There should be at least one extinguisher to every 100 m², unless more is deemed necessary by the local fire authority.
- Fire extinguishers shall be inspected and maintained annually by a registered person (SANS 10105-1, SANS 10105-2, SANS 1475-1, SANS 1475-2).
- A fire hose connected to a water supply should be mounted outside the store.
- A sprinkler system is recommended for stores larger 9 m³.

Record keeping

- Complete written or electronic records must be kept by the designated person of all agrochemicals received, used and disposed of. There should be a record of the amount of a particular chemical used and the balance left in the store.
- Original records should be kept away from the storage area. A copy can be kept in the store.
- Records must be kept in a safe place where it can easily be retrieved for inspection by national, provincial or local authorities.
- Records of chemicals received should contain the following information:
 - product name and batch number;
 - name and address of supplier;
 - quantity and purpose of product;
 - date of receipt; and
 - name of person who received the product.

C Handling and application of pesticides

Preparation and mixing of spray formulations

- Agrochemicals must be prepared and used in the prescribed manner as indicated on the label(s). Any other way is a criminal offence and this must be communicated to workers as such.

- Only prepare the amount of spray mixture required for one specific application.
- If containers with concentrated formulation are transported to filling points further away from the agrochemical store, these containers must be locked into a secure metal or galvanized mesh trunk, which can be securely chained to the tractor and to the filling point during spray operations.

Filling points

- The mixing and filling area for spray equipment must be well away from any water sources.
- The floor of the filling point must be of non-porous material (e.g. cement with damp coursing) and must be bunded (retaining wall).
- Rinse liquid from measuring vessels must be added to the spray tank.
- Soil and water sources may not be contaminated by run-off and/or spillage. Construct a non-permeable evaporation pit that is either filled with stones or covered with a metal grid, into which contaminated run-off water can be channeled. Add a handful of lime to increase the pH. Ultra-violet radiation from the sun, combined with the high pH will break down active ingredients and water will evaporate. Cover the pit when it rains, to prevent rainwater from filling up the pit. Alternatively, install a tank for contaminated water that can be emptied by a professional hazardous waste disposal company.
- According to the Department of Water Affairs and Forestry, soak-aways and French drains are not acceptable for disposing of pesticide contaminated run-off water.

Worker health

- Workers handling chemicals must be declared medically fit to work with agrochemicals. This examination must be done by an Occupational Health practitioner that is a general practitioner with a post-graduate diploma in occupational medicine, and not by a clinic nurse or ordinary general practitioner.
- All workers exposed to and handling pesticides must undergo routine medical examinations (mostly involving a blood test) to test for signs of pesticide exposure. These should preferably be done annually at the end of the

spraying season, but the interval between examinations may not exceed two years.

- Any incident of exposure to pesticides must be documented according to occupational health and safety regulations and national labour regulations – contact Dept. of Labour for further information.
- All medical records and records of pesticide exposure must be kept for at least 30 years for every worker exposed to pesticides. The work-exposure records should be sent to the regional labour representative if farming operations cease.

Training

- All farm workers shall undergo training in the meaning of the signs, warning notices and labels on containers of agrochemicals.
- Formal training (i.e. certificates awarded) in the meaning of signs, warning notices and labels on chemical containers, as well as on the interpretation of written instructions must be provided to all workers handling pesticides .
- Spray operators must receive formal practical training in the safe handling and application of pesticides and must understand the risks involved and precautions to be taken.
- At least two members of each team of spray operators must receive basic first aid training, particularly relating to pesticide exposure.

Protective clothing and equipment

- Protective clothing must be kept separate (i.e. in different lockers) from personal clothing.
- Protective clothing must be thoroughly washed after each application or spray operation before being worn again.
- Contaminated protective clothing must under no circumstances be washed at home and should not be removed from the store area.
- Durable, light-weight and comfortable protective clothing that give splash and droplet protection and are impervious to pesticide formulations must be provided to workers handling pesticides.

- Overalls can be two-piece (jacket with hood and trousers) or one-piece hooded garments.
- Hood must close around gas mask.
- Sleeves must close at wrists with elasticized cuffs and the trousers must have elasticized closures around waist and ankles.
- Jackets of two-piece suits should seal on the hips (e.g. Velcro).
- Overalls should preferably be light in colour so that contamination with pesticides can be visible.
- A clear transparent face shield, which is impervious to solvent and pesticide vapours and which provides full face protection should be worn as indicated on the product label when preparing and applying spray mixtures.
 - Safety goggles are an acceptable alternative to a face shield.
- Non-slippery gloves made of nitrile rubber, PVC, neoprene or butyl rubber that are long enough to give cover to a minimum of 90 mm above the wrist must be used.
 - Lined gloves are not recommended as pesticide can accumulate in the lining material.
 - Gloves should preferably be light in colour so that contamination with pesticides can be visible.
 - Before contaminated gloves are removed from the hands after use, they must first be washed with soap and water. They should again be washed inside out after removal.
- Unlined, rubber boots that are at least calf-high must be used.
 - To prevent pesticide from entering boots, trousers must be worn outside/over the boots.
 - At the end of each day's spraying boots should be washed inside and outside.
- A cotton hat with brim should be used for protection against spray drift.
- A waterproof hat and cape must be worn by operators during overhead spraying.
- A hood that covers the head, neck and shoulders of workers should be worn for total skin protection during the application of irritant powders (e.g. sulphur).

- Respirators should be worn when indicated on the product label and in compliance with SANS 10220.
- Tractors with closed canopies and air conditioning are recommended for maximum safety and comfort during application. This could improve the productivity of operators and the quality of pesticide application and coverage (GAP)¹.

Ablution facilities

- Facilities must be provided for operators to wash or shower at the end of each spray operation or shift.
- Contaminated washing water generated at the ablution facilities shall not be disposed of into any water source, including rivers, ground water sources and sewerage systems. This water can also be channeled into a mesh-covered evaporation pit like the one for the filling area.

Disposal of surplus agrochemicals and empty containers

- Leftover agrochemical formulations must not end up in rivers, streams, ditches, storage dams, etc. and cannot be emptied out on the ground.
- Empty pesticide containers must not be re-used and must be disposed of in a manner that avoids exposure to humans and contamination of the environment. Relevant guidelines appearing on the label(s) should be followed.
- Empty containers may not be burned/incinerated on the farm. This practice is illegal in South Africa.
- Empty containers must be rinsed with integrated pressure rinsing devices on the sprayer, or triple-rinsed (rinsed at least three times) with water, and the rinsate returned to the spray tank, where after it must be sprayed onto the vineyard or kept secure until disposal is possible. The latter can be done in the mesh-covered evaporation pit at the filling area.

¹ GAP = not a legal requirement as yet, but recommended as a good agricultural practice to enhance safe application.

- Triple-rinsed containers can be punctured (in the case of plastics), shattered (in the case of glass) or otherwise rendered unserviceable so as to prevent re-use, whereafter it may be disposed of in a registered hazardous waste landfill site (operated by a registered hazardous waste removal company).
- Empty triple-rinsed plastic containers can also be collected and removed for recycling by a registered recycler. Contact details of some recyclers are available on the IPW website.
- Obsolete or unwanted chemicals should preferably be sent back to local suppliers or alternatively be removed by certified or approved chemical waste disposal companies.
- Leftover formulations should never be combined or mixed while being stored for later removal /disposal.

D References

SANS10206:2007 (2007): South African National Standard: The handling, storage and disposal of pesticides, Introduction. pg 1, South African Bureau of Standards, Pretoria, South Africa

South African Wine and Spirit Board (2008): Integrated Production of Wine in South Africa: Guidelines for Farms. <http://www.ipw.co.za>