MANUAL

TREATMENT AND ENHANCEMENT OF SEED

A Unit Standard for the Seed Industry

Unit Standard 114686
NQF Level 4
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UNIT 1: TREATMENT AND ENHANCEMENT OF SEED

1.1 Introduction

After the processing of seed which includes cleaning, it may be necessary to treat and enhance seed for different purposes such as:

- Disinfect or disinfestate seed to combat seed borne diseases and insects pests and protection of seeds against diseases and pests that may be present in the soil or in the air when seedlings emerge.
- Other specialized seed treatments such as coating and pelleting for specific purposes.
- Treatments to influence the metabolism of seed have been devised to enhance the germination of seed.
- Treatment which leaves no recognisable chemical on the seed e.g. hot water or running water.

Recent advances have dramatically improved the precision of applying seed treatments. Seed is alive and once the viability of seed is harmed, you cannot turn the clock back. Similarly, the effectiveness of chemicals in seed treatments depends on advanced formulation technology and precise application on the seed.

The turning point in the development of professional seed treatment was the high-tech advancements in the equipment that apply seed treatments and the transition to new polymer chemistry for binding and holding the treatment closer to the seed, while remaining water soluble and neutral to the seed itself.

These improvements mean that compared to a decade ago, professional seed treatments today are:

- more uniform on every seed,
- more accurate in rate of application,
- more diversified formulations that combine two or more active ingredients,
- More effective across a wider spectrum of diseases and insect pests.
1.2 Disinfection and disinfestation

This commonly refers to the application of pesticides to seed for the purpose of disinfecting seed, protection against pathogenic organisms and storage insect pests. Disinfection refers to the destroying of fungal spores found within the seed coat or inner tissue. Disinfestation is the destruction of surface organisms which has contaminated the seed surface.

1.2.1 Situations requiring treatment

- Seed suffering physical or mechanical injuries during harvesting or handling thereafter may have damaged coats providing opportunity for fungi infection. This may eventually harm or kill the seed.
- Seed may be infested during harvest or while being processed.
- It may be necessary to plant seed under unfavourable conditions which may favour the growth of certain fungal organisms. These infections can cause harm to the seed sown under these conditions.
- Seed must also be protected against organisms present in soil during germination and early establishment.
- Seed may also require treatment to enhance germination.

1.2.2 Seed treatment methods

Different seed treatment methods are available of which one or many may be used in your workplace. Seed treatment methods can be divided into three groups; mechanical, physical and chemical methods.

Mechanical methods

These methods are used to remove materials mixed with seed. Mechanical treatment can remove most pathogenic organisms from the seed surfaces if thoroughly cleaned but are however not free from pathogens and may require further treatment.

Physical methods

These methods are used primarily used to kill pathogens deep into the seed and include hot-water and water-soak treatments, ultraviolet, infrared, x-ray and other types of irradiation. Dry heat has also been used as a physical method. It is important to note that
physical methods do not protect seeds against organisms present in soil but only against those pathogens present on or in the seed.

**Chemical methods**

These methods are most commonly used due to its effectiveness and ease of handling. Organic and inorganic fungicides can be used, although organic fungicides are used more frequently. Fungicides can be applied as dusts, liquids, or suspensions. The recommended dosage may vary with the chemical, the specific crop, the storage period and the method of application.

The choice of chemical will depends on the type of the seed, nature of the pathogen, the condition of the seed, relative cost, availability of equipment and the weather conditions expected after seeding. The ideal chemical however will be selected keeping the following factors in mind:

- Effectiveness in controlling the pathogen
- Harmless to the seed
- Cost effective
- Easy to use and to apply
- Non-corrosive to equipment
- Stable for long periods
- Relatively harmless to animals and non-toxic to humans
- No interference during the planting process

Dosages will vary with the species of the crop to be treated and the chemical used. Your work site procedures will give exact quantities for each treatment to be conducted in the workplace. When seeds are treated with poisonous substances such as fungicides or insecticides, the law requires that the bag be labelled to indicate this treatment.

**Metabolic methods**

Processes that cause the seed to metabolise, change chemicals within the seed and repair cellular structures.

**1.2.3 Seed treatment equipment**

**Slurry treaters**
Slurry treatment involves the preparation of a suspension of wettable powders in water which is applied to the seeds. The material to be treated is accurately metered through a simple mechanism composed of a slurry cup and seed dump pump. The cup introduces a given amount of slurry with each dump of seed into a mixing chamber where they are blended together. The slurry treaters are adapted to all types of seeds and rates of treating. The small amount of moisture added to seeds does not affect seed in storage since the moisture is added to the seed surface and is soon evaporated.

Powders are the most difficult to handle and to mix, though they are easy to transport. Slurries and liquids are easier to mix, but may cause damage to the seed if not handled carefully. Most seed treatment machines are now design to handle all forms of chemicals.

**Direct treaters**

An example of direct seed-treatment equipment is the Mist-o-matic which applies chemical as a mist to the seed. The machine is equipped with a large treatment tank, a pump and a return that maintains the level on the small reservoir from which the seed is fed.

Below is an example of a seed treater consisting of the following: frame, bunker, the adjustable measuring hopper of seeds, measuring hopper for the chemicals, the conveyer screw of the stainless steel, the system for the preparation of the chemicals, which consists of the tank, pump and chemical preparations.
1.3 Specialized seed treatment

In addition to the previously listed methods of seed treatment, seeds are also required to be treated for other specific purposes.

1.3.1 Seed coatings

The three most common seed coatings will be discussed. They are seed pellets, seed coating and film coating.

Seed coating

This is one of the most economical applications to improve seed performance. A seed coat is a substance applied to the seed that does not obscure its shape. Examples include fungicides, insecticides and micronutrients. An advantage of seed coating is that the seed enhancement material is placed directly on the seed, thus requiring fewer chemicals that if the chemical was broadcast or placed directly in the field.

Film coatings

Film coating are increasingly used by the seed industry. A film coating is a substance applied as a liquid to the seed that does not obscure its shape and increase the weight by no more that 1 – 10%. Film coatings are so thin that the application of multi-layered film coats is possible with each layer containing a specific seed enhancement additive. Most film coating formulations are natural or synthetic polymers that contain a colorant that assist in monitoring planting accuracy during seeding. Film coating can also contain fungicides and insecticides. Another advantage of film coatings is that they have limited dust-off problems making them safer to handle if a fungicide or insecticide has been
included in the formulation. Film coatings can help to smooth the surface texture of winged and other appendaged seeds making them flow more evenly in seeding equipment.

**Seed pellets**

Seed pellets may be the most common seed enhancement in crop production because they improve seed plantability and performance. A seed pelleting substance is one that is applied to the seed and obscures its shape, thereby making flat or irregularly shaped seeds more rounded, small and light seeds larger and heavier thus enhancing precision planting and accurate placement by planters. Most seed are pelleted in a rotating drum. Pellets typically are composed of fillers such as clays, diatomaceous earth, graphite, powdered perlite, or combination of these and other materials. A binding or cementing agent is also applied at specific concentrations that facilitates adhesion of the filler to the seed, thereby adding durability. The filler materials, as well as the binder, can be modified to regulate the water-holding capacity of the pellet.

Hydrophilic or moisture attracting pellets are generally applied to seeds that require greater moisture availability for germination. The risks with such pellets are that there will be reduced oxygen availability for seedling growth if the media are watered excessively. Hydrophobic or moisture repelling materials can be included in pellets where excessive moisture conditions are likely to occur during germination. Seed technologists must understand that pellets vary in composition, and they should adjust their germination conditions accordingly.

### 1.3.2 Seed Hydration

Seeds are hydrated in order to decrease germination time, expand temperature ranges over which germination occurs and to achieve greater uniformity of stand establishment. Four seed hydration techniques will be discussed.

**Pre-hydration**

Soaking seed in water and drying them back before they germinate is the simplest approach to hydrating seeds. This technique minimizes the use of chemicals and avoids the discarding of materials that may be environmentally incompatible. A disadvantage of this approach is that seeds sometimes are not evenly hydrated. This fails to uniformly activate the physiological processes necessary to synchronise and improve seed performance. In addition, some types of seeds may actually be damaged by this method. In this instance, recent innovation called drum priming slowly exposes seeds to precise
quantity to water supplied either in a mist of metered directly to the seeds in a rotating drum. Unlike soaking, the drum priming technique offers a more precise method of regulating the rate of water uptake to a specific seed moisture content, thus avoiding potential excessive water absorption damage.

**Priming**

During priming the water content of seeds is controlled by soaking seeds in aerated salts or high molecular weight compounds such as polyethylene glycol (PEG). The amount of water the seed absorbs is regulated by the concentration of the PEG, the salt, or other osmotic agents. This is the most common seed hydration technique employed by the seed industry.

**Matriconditioning**

Another process to controlled seed hydration mimics the natural process of imbibition in the soil. Seeds are mixed into moist solid carriers such as granulated clay or vermiculite, rather than liquids as in priming. The surface of these compounds creates matric forces that hold the water that is gradually absorbed by the seed, hence the name matriconditioning. After matriconditioning, the solid carrier is sieved from the seed and the hydrated seed is dried. This technique is common in large-seeded crops.

**Pre-germination**

Pre-germination is characterised by a seed that possesses a protruded radical. This is accomplished using a standard priming technique; expect that the seed is permitted to go further down the biochemical road toward germination before re-drying. The results is said to be a faster, more uniformly germinating seed compared to other types of seed hydration treatments.

**1.3.3 Stratification**

Seeds must be mature and environmental factors such as proper levels of water, oxygen, temperature, light and soil conditions must be favorable before germination can take place. Most seeds respond the best when water levels are enough to moisten the seeds but not soak them, when temperatures are slightly higher than room-temperature, and when oxygen is readily available; however this depends on the individual seed variety.

When a mature seed is placed under favorable conditions and fails to germinate, it is said to be dormant. The length of time plant seeds remain dormant can be reduced or eliminated by a simple seed treatment called stratification.
Stratification is a process of pre-treating seeds by simulating natural conditions that the seed must endure before germination. For seeds of trees and plants from temperature climates, stratification involves soaking or chilling the plants before sowing. Some seeds only germinate when temperatures are reached i.e. after a forest fire.

The time taken to stratify seeds depends on species and conditions; in many cases two months is sufficient to break the seed dormancy. After undergoing the cool moist treatment the seeds are ready to plant and will usually sprout in a few days to weeks.

1.4 Personal Protective Equipment

Personal Protective Equipment (PPE) is specialised clothing or equipment worn by employees for protection against health and safety hazards. The equipment is designed to protect parts of the body, i.e., eyes, head, face, hands, feet, and ears. The different types of equipment used may differ from one company to the next. If you are responsible for treating seed with chemicals you must be familiarised with the appropriate equipment worn at your workplace and the location of this equipment. For the purpose of this manual the most frequently used PPE will be discussed.

Hard hat

If there is any danger of falling objects or head injury, a hard hat should always be worn.

Gloves

When working with wooden pallets or any type of material which can cause injury to your hands, protective gloves must be worn. There are many different types of gloves, but you will be provided with those appropriate to your workplace. A special kind of resistant glove is also necessary when working with dangerous chemicals.

Gloves must be:

- appropriate to the material handled
- worn whenever there is potential for contact with corrosive or toxic materials
- worn whenever there is a possibility of injury to your hands, e.g. when lifting loads manually
- cleaned after use
- replaced periodically depending upon use and type of material handled
Hearing protection

Noise is a common problem in many workplaces. High levels of noise can gradually damage your hearing and this is unfortunately a permanent handicap. The following types of hearing protection equipment are available:

- Foam Earplugs
- PVC Earplugs
- Earmuffs

Safety shoes

If you work in and around a fabrication workshop there is always a possibility of heavy objects falling on your feet or sharp objects puncturing your foot. Hazardous liquids such as chemicals can spill into your shoes and boots. These hazardous materials can cause chemical and other burns. Heavy machinery, equipment, and other objects can roll over your feet often resulting in broken or crushed bones. Safety shoes are compulsory for all lifting and transferring equipment operators.

Safety glasses

Safety glasses are usually made from shatter-resistant plastic lenses to protect the eyes from flying materials. Although safety lenses may be constructed from a variety of materials that vary in impact resistance, certain standards suggest that they maintain a minimum 1mm thickness at the thinnest point, regardless of material. If chemicals splash in your face or eyes, flush skin and eyes with water for at least 15 minutes and then get medical attention.

Respirators / Dust masks

A dust mask should always be worn when working with harmful gases and in areas with a lot of dust. Special masks protecting the respiratory (breathing) canal must be worn when working with extremely dangerous gases or in areas with a high carbon monoxide concentration.

Complete Exercise 1, 2 and 3 in your workbook
ANNEXURE 1: STATUTORY REQUIREMENTS

South Africa Act 36 of 1947

FERTILIZERS, FARM FEEDS, AGRICULTURAL REMEDIES AND STOCK REMEDIES
ACT 36 OF 1947

Preamble

ACT: To provide for the appointment of a Registrar of Fertilizers, Farm Feeds and Agricultural Remedies; for the registration of fertilizers, farm feeds, agricultural remedies, stock remedies, sterilizing plants and pest control operators; to regulate or prohibit the importation, sale, acquisition, disposal or use of fertilizers, farm feeds, agricultural remedies and stock remedies; to provide for the designation of technical advisers and analysts; and to provide for matters incidental thereto.

Commencement

Date of Commencement: 1 June 1948

Repeal, Savings

Amendments as amended by:

Fertilizers, Farm Feeds, Seeds and Remedies Amendment Act 48 of 1950

Seeds Act 28 of 1961

Fertilizers, Farm Feeds and Remedies Amendment Act 60 of 1970

Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Amendment Act 17 of 1972

Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Amendment Act 24 of 1977

Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Amendment Act 4 of 1980

General Law Amendment Act 49 of 1996 also amended by:

South African Medicines and Medical Devices Regulatory Authority Act 132 of 1998

Definitions

1. In this Act -
'advertisement' means any written, illustrated, visual or other descriptive material or oral statement, communication, representation or reference distributed to members of the public or brought to their notice in any other manner and which is intended to promote the sale of fertilizers, farm feeds, agricultural remedies or stock remedies or encourage the use thereof or draw attention to the nature, properties, advantages or uses thereof, and 'advertise' has a corresponding meaning;

'agricultural remedy' means any chemical substance or biological remedy, or any mixture or combination of any substance or remedy intended or offered to be used-

(a) for the destruction, control, repelling, attraction or prevention of any undesired microbe, alga, nematode, fungus, insect, plant, vertebrate, invertebrate, or any product thereof, but excluding any chemical substance, biological remedy or other remedy in so far as it is controlled under the Medicines and Related Substances Control Act, 1965 (Act 101 of 1965), or the Hazardous Substances Act, 1973 (Act 15 of 1973); or

(b) as plantgrowth regulator, defoliant, desiccant or legume inoculant, and anything else which the Minister has by notice in the Gazette declared an agricultural remedy for the purposes of this Act:

'analyst' means a person appointed as such in terms of section fourteen;

'board' means any board appointed by the Minister in terms of section 6;

'establishment' in relation to a fertilizer, farm feed, agricultural remedy or stock feed, means the premises where such fertilizer, farm feed, agricultural remedy or stock feed is manufactured, controlled, packed, marked or labelled for the purposes of sale;

'mark' means a mark as defined in section 1 of the Trade Marks Act, 1963 (Act 62 of 1963);

'Minister' means the Minister of Agriculture;

'officer' means an officer as defined in section 1 of the Public Service Act, 1957 (Act 54 of 1957);

'pest control operator' means a person who as, or in the course of, his trade or occupation administers agricultural remedies for the purposes for which they are intended;

'prescribed' means prescribed by regulation under this Act;

'registrar' means the Registrar of Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies designated in terms of section 2, and includes an officer acting under a delegation from or under the control or direction of the registrar;
'regulation' means any regulation made under this Act;

'sell' includes agree to sell, or to offer, advertise, keep, expose, transmit, convey, deliver or manufacture for sale or to exchange or to dispose of to any person in any manner for any consideration whatever, or to transmit, convey or deliver in pursuance of a sale, exchange or disposal as aforesaid; and 'sale' has a corresponding meaning;

'stock remedy' means a substance intended or offered to be used in connection with domestic animals, livestock, poultry, fish or wild animals (including wild birds), for the diagnosis, prevention, treatment or cure of any disease, infection or other unhealthy condition, or for the maintenance or improvement of health, growth, production or working capacity, but excluding any substance in so far as it is controlled under the Medicines and Related Substances Control Act, 1965 (Act 101 of 1965);

'technical adviser' means a technical adviser designated in terms of section 14;

'this Act' includes any regulations thereunder.

Establishment of regulatory body

Registration of pesticides

Designation of registrar

2. Designation of registrar

(1) The Minister shall designate an officer in the Department of Agricultural Technical Services as the Registrar of Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies who shall, subject to any instructions issued by the Minister, exercise the powers, perform the functions and carry out the duties conferred upon, assigned to or imposed upon the registrar under this Act.

(2) (a) Any power conferred upon, function assigned to or duty imposed upon the registrar may be exercised, performed or carried out by an officer under a delegation from or under the control or direction of the registrar.

(b) Any decision made or instruction issued by any such officer may be withdrawn or amended by the registrar, and shall, until it has been so withdrawn or amended, be deemed, except for the purpose of this paragraph, to have been made or given by the registrar.

Application for registration

3. Application for registration
(1) (a) Application for registration of a fertilizer, farm feed, agricultural remedy, stock remedy, sterilizing plant or pest control operator shall be made to the registrar in the prescribed manner and shall be accompanied by the prescribed application fee.

(b) Any person applying for registration in terms of paragraph (a) shall supply or make available to the registrar, in the manner and at the time and place that he determines, the samples and particulars that he requires.

(2) If, after consideration of any such application and after such investigation and enquiry as he may deem necessary, the registrar is satisfied that-

(a) the fertilizer, farm feed, agricultural remedy or stock remedy in respect of which registration is applied for is suitable and sufficiently effective for the purposes for which it is intended, and complies with such requirements as may be prescribed, and that it is not contrary to the public interest that it be registered, and that the establishment where it is manufactured is suitable for such manufacture, he shall register such fertilizer, farm feed, agricultural remedy or stock remedy;

(b) the sterilizing plant in respect of which registration is applied for is suitable and sufficiently effective for the purpose for which it is intended, and complies with such requirements as may be prescribed, and that it is not contrary to the public interest that such sterilizing plant be registered, he shall register such sterilizing plant;

(c) the pest control operator in respect of whom registration is applied for has the prescribed qualifications or is otherwise, to such extent as may be determined by the registrar, skilled in the use of agricultural remedies, and that it is not contrary to the public interest that such pest control operator be registered, he shall register such pest control operator:

Provided that the registrar may refuse an application for registration of a fertilizer, farm feed, agricultural remedy, stock remedy, sterilizing plant or pest control operator if any previous registration of such a fertilizer, farm feed, agricultural remedy, stock remedy, sterilizing plant or pest control operator has been cancelled under section 4.

(3) Any registration under this section shall be subject to the prescribed and any additional conditions as may be determined by the registrar and shall be valid for such period as may be prescribed, and the registrar shall issue in respect of such registration a certificate of registration to the person applying therefore.

(4) (a) Any registration under this section may be renewed when the period for which it is valid has lapsed.
b) The provisions of subsections (1), (2) and (3) shall mutatis mutandis apply to the renewal of any registration

Cancellation of registration

4. Cancellation of registration

(1) The registrar may cancel the registration of any fertilizer, farm feed, agricultural remedy or stock remedy at any time if he is satisfied-

(a) that a person has in connection with the registration concerned contravened or failed to comply with a provision of this Act;

(aa) that a person has contravened or failed to comply with a condition to which the registration concerned is subject;

(b) that such fertilizer, farm feed, agricultural remedy or stock remedy is not of the composition and efficacy specified in the application for registration thereof, does not possess the chemical, physical and other properties so specified and does not comply with any requirements that may be prescribed;

(c) that the practices followed and facilities available at or in respect of the establishment or the operation of the undertaking at such establishment are not suitable for the manufacture of the fertilizer, farm feed, agricultural remedy or stock remedy concerned;

(d) that the person managing such undertaking does not have sufficient knowledge of the relevant provisions of this Act or of the practices to be followed in the operation of such undertaking;

(e) that it is contrary to the public interest that such fertilizer, farm feed, agricultural remedy or stock remedy, shall remain registered; or

(f) that any incorrect or misleading advertisement is used in connection with such fertilizer, farm feed, agricultural remedy or stock remedy.

(2) The registrar may cancel the registration of any sterilizing plant at any time if he is satisfied that-

(a) a person has in connection with the registration concerned contravened or failed to comply with a provision of this Act;

(b) a person has contravened or failed to comply with a condition to which the registration concerned is subject;
(c) the sterilizing plant does not comply with the prescribed conditions or is otherwise not effectively equipped for the sterilization of the substances referred to in the definition of 'sterilizing plant';

(d) it is contrary to the public interest that the sterilizing plant shall remain registered.

(3) The registrar may cancel the registration of any pest control operator at any time if he is satisfied that-

(a) the pest control operator has contravened or failed to comply with a provision of this Act or a condition of his registration;

(b) the pest control operator has failed to comply with an order issued under section 6A;

(c) it is contrary to the public interest that the pest control operator shall remain registered.

Certificate of registration

4A. Availability, lapse and return of certificate of registration

(1) The person to whom a certificate of registration has been issued in terms of section 3 shall-

(a) in the case of a fertilizer, farm feed, agricultural remedy or stock remedy, cause that certificate of registration or a copy thereof to be available for inspection by the registrar at all times at the establishment where such fertilizer, farm feed, agricultural remedy or stock remedy is manufactured; or

(b) in the case of a sterilizing plant or a pest control operator, produce that certificate of registration or a copy thereof to the registrar when he is so requested.

(2) The registration of any fertilizer, farm feed, agricultural remedy or stock remedy and the certificate of registration issued in respect of such registration shall lapse-

(a) if the person to whom that certificate of registration has been issued, ceases to manufacture or sell the fertilizer, farm feed, agricultural remedy or stock remedy in question; or

(b) if the establishment in question is no longer used for the manufacture of such fertilizer, farm feed, agricultural remedy or stock feed.

(2A) The registration of any sterilizing plant and the certificate of registration issued in respect of such registration shall lapse if the registered plant ceases to be used as a sterilizing plant.
(2B) The registration of any pest control operator and the certificate of registration issued in respect of such registration shall lapse if the registered person ceases to be a pest control operator.

(3) When the registration of any fertilizer, farm feed, agricultural remedy, stock remedy, sterilizing plant or pest control operator has lapsed in terms of subsection (2), (2A) or (2B) or has been cancelled in terms of section 4, the certificate of registration in question shall, within the prescribed period, be returned to the registrar by the person to whom it was issued.

Reasons for refusal of registration

5. Furnishing of reasons for refusal of, determination of conditions on or cancellation of registration

If-

(a) any application for registration in terms of this Act is refused;

(b) conditions are determined under section 3 (3) on registration; or

any registration is cancelled in terms of section 4,

the registrar shall in writing furnish the applicant concerned or the person to whom the certificate of registration in question was issued, with the reasons for such refusal, determination of conditions or cancellation, as the case may be.

Appeal

6. Appeal against decisions of registrar

(1) A person who feels aggrieved by any decision referred to in section 5 may, within the period and in the manner prescribed and upon payment of the prescribed fees, appeal to the Minister against such decision.

(2) The Minister shall refer the appeal for consideration and decision to a board of which the members shall be appointed by him, and which shall consist of-

(a) one person designated as chairman on account of his knowledge of law; and

(b) two persons who in the opinion of the Minister command sufficient knowledge regarding the matters which will probably be in issue when the appeal is considered.

(3) Any appeal noted in terms of subsection (1) shall be heard on the date and at the time and place fixed by the chairman of the board and he shall advise the appellant and the registrar in writing thereof.
(4) The chairman of the board may for the purposes of the decision of an appeal-

(a) summon any person who, in his opinion, may give relevant information concerning the
issues in the appeal or who has or is suspected to have in his possession or custody or
under his control any document which has any bearing upon the issues in the appeal, to
appear before the board at a time and place specified in the summons, to be interrogated
or to produce that document, and the chairman may retain for examination any document
so produced;

(b) administer an oath to or accept an affirmation from any person called as a witness at
the hearing of the appeal;

(c) call any person present at the hearing of the appeal as a witness and interrogate him
and require him to produce any document in his possession or custody or under his
control.

(5) The procedure at the hearing of an appeal shall be determined by the chairman of the
board in question.

(6) Any person appealing in terms of this section and the registrar may be represented at
the hearing of such appeal by an advocate or an attorney.

Discontinuation of equipment use

6A Registrar may order pest control operator to discontinue use of certain equipment if the
registrar is of opinion that any equipment used by any registered pest control operator for
the administration of any particular agricultural remedy is so unsuited for the
administration of such remedy that the purpose for which the remedy is administered may
be defeated, he may order the pest control operator to discontinue the use of such
equipment when administering the said remedy.

Limitation of liability

23A Limitation of liability

Except where it is expressly otherwise provided for in this Act, no compensation shall be
payable by the State, the Minister or the registrar in respect of any act done in good faith
under this Act.

Licensing and certification

Sale

7. Sale of fertilizers, farm feeds, agricultural remedies and stock remedies
(1) No person shall sell any fertilizer, farm feed, agricultural remedy or stock remedy unless-

(a) it is registered under this Act under the name or mark under which it is so sold: Provided that a fertilizer, farm feed, agricultural remedy or stock remedy in respect of which the period of validity of the registration has expired, the certificate of registration has been cancelled in terms of section 4 or has lapsed in terms of section 4A (2) and which, before or on the date of such cancellation or lapse, was no longer under the control of, or owned by the person to whom that certificate of registration was issued, may, subject to the provisions of section 7bis, be sold;

(b) it is, subject to the provisions of paragraph (c), packed in such manner and mass or volume as may be prescribed;

(c) the container in which it is sold, complies with the prescribed requirements and is sealed and labelled or marked in such manner as may be prescribed or, if it is not sold in a container, it is accompanied by the invoice referred to in section 9; and

(d) it is of the composition and efficacy specified in the application for registration thereof, possesses all chemical, physical and other properties so specified, and complies with the prescribed requirements.

(2) (a) No person shall for reward or in the course of any industry, trade or business-

(i) use, or recommend the use of, any agricultural remedy or stock remedy for a purpose or in a manner other than that specified on the label on a container thereof or described on such container;

(ii) use any agricultural remedy unless he is a pest control operator registered in terms of this Act or otherwise than in the presence and under the supervision of a pest control operator so registered.

(b) The provisions of paragraph (a) shall, in the case of a stock remedy, not apply to a veterinarian registered under the Veterinary Act, 1933 (Act 16 of 1933).

Prohibitions

7bis. Prohibition on acquisition, disposal, sale or use of certain fertilizers, farm feeds, agricultural remedies and stock remedies

(1) The Minister may by notice in the Gazette-

(a) prohibit the acquisition, disposal, sale or use of fertilizers, farm feeds, agricultural remedies or stock remedies; or
(b) prohibit such acquisition, disposal, sale or use, except in accordance with such conditions as may be specified in the notice or except under the authority of and in accordance with such conditions as may be specified in a permit issued by the registrar, and may in like manner repeal or amend any such notice.

(2) Any prohibition issued under subsection (1) may apply-

(a) throughout the Republic or in one or more specified areas;

(b) to any person or to persons belonging to any specified class or group of persons or to persons other than persons belonging to any such class or group of persons; or

(c) in respect of all or one or more classes or kinds of fertilizers, farm feeds, agricultural remedies or stock remedies.

(3) Any condition referred to in subsection (1) shall not be subject to any limitations of whatever nature, and such conditions may differ in respect of different areas, persons or classes or groups of persons.

Invoice requirements

9. Invoices required in case of sale of fertilizers, farm feeds, agricultural remedies and stock remedies not in a container

Any person who sells any fertilizer, farm feed, agricultural remedy or stock remedy not in a container, shall give to the purchaser at the time of delivery or send to him at the time of despatch an invoice setting forth such particulars in respect of such fertilizer, farm feed, agricultural remedy or stock remedy as may be prescribed.

Notifications before application

10. Furnishing of particulars before administration of fertilizers, farm feeds and agricultural remedies

(1) Any person who at the request of the owner or the person in control of a thing administers for consideration any fertilizer, farm feed or agricultural remedy to the said thing, shall, before such administration, notify such owner or person of-

(a) the purpose of such administration;

(b) the registered name and number of the fertilizer, farm feed or agricultural remedy so to be administered;

(c) the precautions to be taken before, during and after such administration.

(d) the number of his certificate of registration, if he is a registered pest control operator.
(2) The notification referred to in subsection (1) may be furnished verbally provided it is confirmed in writing within three days after the administration concerned.

Exclusions

13. Exclusion of any fertilizer, farm feed, agricultural remedy or stock remedy from operation of Act

The Minister may by notice in the Gazette exclude, subject to such conditions as he may determine, any fertilizer, farm feed, agricultural remedy or stock remedy from the operation of any or all of the provisions of this Act.

Importation

16. Import of fertilizers, farm feeds, agricultural remedies and stock remedies

(1) No person shall import any fertilizer, farm feed, agricultural remedy or stock remedy into the Republic unless-

(a) such fertilizer, farm feed, agricultural remedy or stock remedy is registered in terms of this Act, is of the composition and efficacy specified in the application for registration thereof, possesses all chemical, physical and other properties so specified and complies with the requirements prescribed in respect thereof and is packed in a sealed container which is marked or labelled in the prescribed manner with the prescribed particulars;

(b) in the case of a fertilizer or farm feed containing bone or any other substance derived from the carcass of an animal, a permit referred to in section 12 has been issued in respect thereof.

(2) Notwithstanding the provisions of subsection (1) the registrar may, in his discretion and on such conditions as he may determine, in writing permit the import of any consignment of any fertilizer, farm feed, agricultural remedy or stock remedy which does not comply with the requirements referred to in subsection (1) (a).

(3) Fertilizers, farm feeds, agricultural remedies or stock remedies imported shall-

(a) only be imported through a prescribed port or place;

(b) if the registrar directs that a sample thereof be taken, not be removed from any such port or place without the written authority of the registrar;

(c) if the registrar thus directs, be made available for examination and the taking of a sample at any such port or place in the prescribed manner; and

(d) if a sample thereof has thus been taken, not be sold in the Republic except on the written authority of the registrar and subject to the conditions specified therein.
(4) The provisions of section 15 relating to samples shall mutatis mutandis apply with reference to a sample taken in terms of this section.

(5) If any fertilizer, farm feed, agricultural remedy or stock remedy, which in terms of subsection (3) (b) may not be removed from a port or place, is found to comply with the requirements of this Act, no rent charges shall be payable by the importer in respect of the period in which it could not be so removed, or where the Railways Administration is required to deliver or to forward that fertilizer, farm feed, agricultural remedy or stock remedy, in respect of any portion of the period in question which is subsequent to the presentation to the Railways Administration of a delivery order, or a forwarding order, as the case may be.

(6) (a) If any fertilizer, farm feed, agricultural remedy or stock remedy has been imported contrary to the provisions of this section, such fertilizer, farm feed, agricultural remedy or stock remedy shall at the option of the importer thereof-

(i) at the expense of such importer be removed by him from the Republic within such period as the registrar may determine; or

(ii) be forfeited to the State and be either destroyed or otherwise disposed of as the registrar may direct,

and if such importer fails to remove such fertilizer, farm feed, agricultural remedy or stock remedy in terms of the provisions of subparagraph (i) within the period referred to in that subparagraph, it shall be forfeited to the State, and be either destroyed or otherwise disposed of as the registrar may direct.

(b) Any costs incurred by the State in connection with the destruction or disposal of any fertilizer, farm feed, agricultural remedy or stock remedy in terms of the provisions of paragraph (a), may be recovered from the importer concerned.

Sampling, analysis and confiscation

Designation of advisers & analysts

14. Designation of technical advisers and analysts

For the purpose of this Act, the Minister may from time to time designate persons, including officers, as-

(a) technical advisers who shall advise the registrar in regard to matters referred to them by the registrar; and
(b) analysts to analyse samples of fertilizers, farm feeds, agricultural remedies or stock remedies referred to them by the registrar, and to report thereon in the form and manner prescribed.

15. Power of entering premises, examinations, analysis of samples, and seizure

(1) The registrar may at all reasonable times-

(a) enter upon and examine any place, premises or vehicle in respect of which he has reason to believe that on or in it there is manufactured, processed, treated, prepared, graded, classified, packed, marked, labelled, held, bottled, removed, transported, exhibited, sold or used any fertilizer, farm feed, agricultural remedy or stock remedy, and examine or test any such fertilizer, farm feed, agricultural remedy, stock remedy or any ingredient thereof;

(b) examine all books and documents on or in any place, premises or vehicle referred to in paragraph (a) in respect of which he has reasonable grounds for believing that they relate to any fertilizer, farm feed, agricultural remedy, stock remedy or an ingredient thereof, and make copies of or extracts from such books or documents;

(c) examine any operations or processes carried out at any place or premises referred to in paragraph (a) in connection with the manufacture, processing, treatment, preparation, grading, classification, packing, marking, labelling, holding, bottling, removal, transport, exhibition, selling or use of any fertilizer, farm feed, agricultural remedy or stock remedy, and demand from the person in charge of such operations or processes, or the owner of or the person having the custody of any fertilizer, farm feed, agricultural remedy or stock remedy or an ingredient thereof, any relevant information or explanation relating to any such operations or processes, or fertilizer, farm feed, agricultural remedy, stock remedy or ingredient;

demand from the owner or any person having the custody of any book or document referred to in paragraph (b) an explanation relating to any record or entry therein;

(e) seize any book, document, fertilizer, farm feed, agricultural remedy or stock remedy which may furnish proof of an offence in terms of this Act, or any quantity of any fertilizer, farm feed, agricultural remedy or stock remedy in respect of which there is reason to believe that any such offence has been committed, and remove from or leave on or in the place, premises or vehicle in question, any book, document, fertilizer, farm feed, agricultural remedy or stock remedy, or any quantity thereof, which has so been seized, and may in his discretion place on such book, document, fertilizer, farm feed, agricultural
remedy or stock remedy, or the container thereof, such identification mark or seal as he may deem necessary;

(f) take samples or cause samples to be taken of any fertilizer, farm feed, agricultural remedy, stock remedy or an ingredient thereof, and open any container which contains or is suspected to contain anything used or intended for use in the manufacture, processing, treatment, preparation, grading, classification, packing, marking, labelling, holding, bottling, removal, transport, exhibition or sale of any fertilizer, farm feed, agricultural remedy or stock remedy, and examine, analyse, grade or classify such samples, or cause such samples to be examined, analysed, graded or classified.

(2) Where the registrar carries out any examination in terms of subsection (1) in the presence of any person affected thereby, he shall first produce his written authority to such person.

(3) Any sample taken in terms of subsection (1) shall-

(a) be taken in accordance with the prescribed method;

(b) be taken in the presence of the owner or the person having the custody of that fertilizer, farm feed, agricultural remedy, stock remedy or ingredient thereof, or, if such owner or person is not available, in the presence of any other witness; and

(c) in the presence of such owner or person, or such witness, be divided into three parts, and each part shall be packed in a suitable container and sealed with a seal and be labelled or marked in such manner as the nature thereof permits, so that such sample may be readily identified.

(4) One part each of the sample which has been thus divided shall-

(a) be handed or forwarded by registered post to such owner or person;

(b) together with a certificate in the prescribed form be forwarded to an analyst who shall as soon as practicable test, examine or analyse the said part in accordance with the methods which the registrar may determine, and the result of such test, examination or analysis shall be recorded by such analyst on the prescribed form and be submitted to the registrar; and

(c) be retained by the registrar.

(5) The owner of anything from which any sample referred to in subsection (1) (f) was taken, may claim from the registrar an amount equal to the market value of such sample.

Derogations
Power to issue regulations

23. Regulations

The Minister may make regulations-

(a) prescribing the manner in which fertilizers, farm feeds, agricultural remedies, stock remedies, sterilizing plants and pest control operators may be registered, the manner in which any such registration may be renewed and the information to be furnished and the fees to be paid with any application for registration and renewal of registration;

(b) prescribing the description and conditions under which any substance may be registered, imported or sold as a fertilizer, farm feed, agricultural remedy or stock remedy under any particular name or mark;

(c) prescribing the manner in which and the time within which an appeal under section six must be noted and prosecuted;

(d) prescribing the particulars to be set forth in any invoice to be furnished under section nine;

(e) prescribing the composition, efficacy, chemical, physical or other property required in respect of any substance in order that it may be imported, sold or registered as a fertilizer, farm feed, agricultural remedy or stock remedy, as the case may be;

(f) prescribing the limits within which any fertilizer, farm feed, agricultural remedy or stock remedy may be deficient in any of its ingredients and the proportion in which any preservative, antiseptic or other constituent may be present therein;

(g) prescribing requirements as to the mass and volume and containers in which fertilizers, farm feeds, agricultural remedies or stock remedies shall be packed, the manner in which they shall be packed into such containers, the manner in which such containers shall be sealed and labelled or marked and the particulars which shall appear on such labels and containers;

(h) prescribing the processes by which fertilizers, farm feeds, agricultural remedies or stock remedies, or substances used in the manufacture of fertilizers, farm feeds, agricultural remedies or stock remedies shall be sterilized, and the manner of inspection of sterilizing plants;

(hA) prescribing the requirements with which any establishment shall comply, the practices which shall be followed in the operation of any undertaking at any establishment, the facilities which shall be available at any establishment, and the records to be kept and
the information to be furnished in respect of any establishment and the operation of any
undertaking at any establishment;

(hB) prescribing the records to be kept and the returns to be rendered in respect of
registered sterilizing plants;

(hC) prescribing the records to be kept and the returns to be rendered by registered pest
control operators;

(i) for preventing the adulteration of fertilizers, farm feeds, agricultural remedies or stock
remedies or the tampering with containers thereof;

(j) prescribing the methods to be employed, the fees to be paid, and the certificates to be
issued in respect of the examination, analysis or test of samples taken under this Act;

(k) for preventing the use of false or misleading statements in advertisements of fertilizers,
farm feeds, agricultural remedies or stock remedies;

(l) requiring any person who has in his possession or under his control any fertilizers, farm
feeds, agricultural remedies or stock remedies, to keep records relating thereto in the form
and manner prescribed, and to render returns in the form and manner and at the times
prescribed;

(m) prohibiting the disposal, acquisition or use of any farm feed as a fertilizer;

(n) in respect of any other matter under this Act which is to be prescribed, and generally
for the efficient carrying out of the objects and purposes of this Act.

(2) Different regulations may be made under this section in respect of different classes or
kinds of fertilizers, farm feeds, agricultural remedies and stock remedies, and in respect of
different kinds of establishments and different classes or groups of persons.

(3) Any regulations made under this section may prescribe penalties for any contravention
thereof or failure to comply therewith, but not exceeding the maximum penalty prescribed
by section eighteen.

(4) Before any regulations are made under this section, such regulations shall be
published by the Minister in the Gazette together with a notice intimating that it is
proposed to issue such regulations as regulations under this section within a stated
period, but not less than four weeks as from the date of the said publication, and inviting
interested persons to submit any objections to or representations concerning the
proposed regulations: Provided that, if the Minister thereafter determines on any
alterations in the regulations published as aforesaid, as a result of any objections or
representations submitted thereanent, it shall not be necessary to publish such alterations, before finally issuing the regulations in terms of subsection (1).

(5) Any regulation involving financial matters shall be made in consultation with the Minister of Finance.

Offences & Penalties

18. Offences and penalties

(1) Any person who-

(a) fails to comply with the provisions of section 9;

(b) obstructs or hinders the registrar, any technical adviser or any analyst in the exercise of his powers or performance of his duties under this Act;

(bA) fails to make any statement or give any explanation if he is requested thereto by the registrar in the exercise of his powers or the performance of his duties under this Act;

(bB) fails to comply with an order issued under section 6A;

[Para. (bB) inserted by s. 8 (a) of Act 4 of 1980.]

(c) contravenes or fails to comply with the provisions of section 7, 8, 10, 12 or 16 or with any condition contemplated in section 3 (3), 16 (2) or 16 (3) (d);

[Para. (c) substituted by s. 8 (b) of Act 4 of 1980.]

(c) bis acquires, disposes of, sells or uses fertilizers, farm feeds, agricultural remedies or stock remedies contrary to a prohibition issued under section 7bis;

(e) tampers with any sample taken in terms of this Act, or with anything seized in terms of this Act;

(f) makes use, in connection with any fertilizer, farm feed, agricultural remedy or stock remedy, of any certificate, invoice or other document issued in respect of any other fertilizer, farm feed, agricultural remedy or stock remedy, or which is no longer valid;

(g) makes any false or misleading statement in connection with any fertilizer, farm feed, agricultural remedy or stock remedy-

(i) in an application for the registration thereof;

(ii) in any invoice issued in terms of section 9;

(iii) in any advertisement thereof;
(iv) in the course of the sale thereof;

(v) in an application for a permit referred to in section 7bis (1) (b);

(vi) in a notice referred to in section 10;

(vii) if he acts in accordance with the provisions of section 16 (1) (b);

(h) sells any fertilizer, farm feed, agricultural remedy or stock remedy upon the container of which a false or misleading statement in connection with such contents is printed or written;

(i) sells any fertilizer, farm feed, agricultural remedy or stock remedy which is not of the kind, nature, composition, strength, potency or quality described or represented when so sold;

(j) having been duly summoned in terms of section 6 (4) (a) to appear before the board, fails without lawful excuse so to appear;

(k) having appeared as a witness before the board, refuses without lawful excuse to be sworn or to make affirmation or to produce any document or answer any question which he may be lawfully required to produce or answer;

(l) fails to comply with the provisions of section 4A (1) or (3), shall be guilty of an offence and liable on conviction-

(i) in the case of a contravention under paragraph (a), (b), (bA) or (l) to a fine not exceeding five hundred rand or imprisonment for a period not exceeding twelve months or to both such fine and such imprisonment; and

(ii) in the case of a contravention under paragraph (bB), (c), (c)bis, (e), (f), (g), (h), (i), (j) or (k) to a fine not exceeding one thousand rand or imprisonment for a period not exceeding two years or to both such fine and such imprisonment.

[Para. (ii) substituted by s. 8 (c) of Act 4 of 1980.]

(2) The court convicting any person of an offence under this Act, may, upon the application of the prosecutor, declare any fertilizer, farm feed, agricultural remedy or stock remedy in respect of which the offence has been committed and all fertilizers, farm feeds, agricultural remedies or stock remedies of a similar nature to that in respect of which such person has been convicted, and of which such person is the owner, or which are in his possession, to be forfeited to the State.

(3) All fertilizers, farm feeds, agricultural remedies or stock remedies forfeited under this Act shall be destroyed or otherwise dealt with as the Minister may direct.
Preservation of secrecy

17. Preservation of secrecy

Any person who discloses except to the Minister or to any other person for the purpose of the performance of his duties or the exercise of his functions under this Act or when required to do so by any court or under any law, any information acquired by him in the exercise of any duty or function under this Act, in relation to the business or affairs of any other person shall be guilty of an offence and liable on conviction to a fine not exceeding five hundred pounds or imprisonment for a period not exceeding twelve months.

Jurisdiction of magistrate's court

19. Jurisdiction of magistrate's court

Notwithstanding anything to the contrary in any other law contained a magistrate's court shall have jurisdiction to impose any penalty prescribed by this Act.

Procedure and evidence

20. Procedure and evidence

(1) In any criminal proceedings under this Act-

(a) any quantity of a fertilizer, farm feed, agricultural remedy or stock remedy in or upon any premises, place, vessel or vehicle at the time a sample thereof is taken pursuant to the provisions of this Act shall, unless the contrary be proved, be deemed to be of the same composition, to have the same degree of efficacy and to possess in all other respects the same properties as that sample;

(b) any person who is proved to have tampered with any sample shall be deemed to have acted with fraudulent intent unless the contrary is proved;

(c) a certificate stating the result of an analysis or test carried out in pursuance of the provisions of subsection (3) of section fifteen and purporting to be signed by the analyst who carried out such analysis or test shall be accepted as prima facie proof of the facts stated therein;

(d) any statement or entry contained in any book or document kept by any manufacturer, importer or owner of a fertilizer, farm feed, agricultural remedy or stock remedy, or by the manager, agent or employee of such person, or found upon or in any premises occupied by, or any vehicle used in the business of such person, shall be admissible in evidence against him as an admission of the facts set forth in that statement or entry, unless it is proved that that statement or entry was not made by such person, or by any manager,
agent or employee of such person in the course of his work as manager, or in the course
of his agency or employment.

(2) No prosecution shall be instituted as a result of any analysis or test performed in terms
of the provisions of section fifteen or section sixteen, unless a copy of the analyst's
certificate has been transmitted at least twenty-one days before the institution of such
prosecution to the person who is to be the accused.

Special defence

21. Special defence in case of prosecutions

It shall be a sufficient defence for a person charged with the sale of any fertilizer, farm
feed, agricultural remedy or stock remedy in contravention of section 7 (1) (d) if he proves
to the satisfaction of the court-

(a) that he purchased such fertilizer, farm feed, agricultural remedy or stock remedy under
a registered name or mark as being the same in all respects as the article which he
purported to sell;

(b) that he had no reason to believe at the time of the sale that it was in any respect
different from such article;

(c) that he sold it in the original container and in the state in which it was when he
purchased it; and

(d) that the container thereof complied with the prescribed requirements and was sealed
and labelled or marked in the prescribed manner with the prescribed particulars.
ANNEXURE 2: REFERENCES

This document does not claim to be an original publication. Various sources of information and documents were used when compiling this document. Any neglect to make reference of any source, including an author, web site or publication is not through intent. Such omissions should be brought to the attention of SANSOR, who will gladly rectify the omission.

Plant Improvement Act (1976)

http://www.cisco-eagle.com

http://www.cdc.gov
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PURPOSE OF THE UNIT STANDARD
A learner who has achieved this unit standard will be competent in:

- Perform treatment and enhancement of seed, without supervision, to maintain and improve quality.

LEARNING ASSUMED TO BE IN PLACE
To enter a learning programme for this unit standard or to be assessed against this unit standard, the learner is assumed to have:

- Literacy, numeracy and communication skills at or equivalent to NQF level 3.
- Introduction to seed industry and relevant workplace.
- An understanding of safety in the work place at NQF level 3.
- An understanding of supplier and customer relationships.
- Basic mechanical skills.
- Computer literacy.

UNIT STANDARD RANGE (General guide for scope, context and level)
- The scope of this unit standard deals with the treatment and enhancement of seed.
- Treatment and enhancement will include, but is not limited to, chemical treatment, pelletising, priming and coating. The specific outcomes as reflected in this unit standard are performed without direct supervision, but with access to work site procedures and operating instructions.

Specific Outcomes and Assessment Criteria:

**SPECIFIC OUTCOME 1** Prepare for the treatment and enhancement process.

OUTCOME NOTES
Preparing the work area according to work site and safety procedures.

- Obtaining treatment and enhancement instructions and documentation according to work site procedures and statutory requirements.
- Contributing to treatment and enhancement plan by determining a sequence of operation according to work-site procedures.
- Selecting appropriate equipment and materials according to work site and quality procedures.
- Selecting appropriate personal protective equipment (PPE) according to statutory requirements.

ASSESSMENT CRITERIA

**ASSESSMENT CRITERION 1** Assessors will observe, confirm and evaluate evidence that will indicate that learners have demonstrated competence in each of the specific outcomes. In this unit standard the following specific criteria should be used:

- Job instructions, oral or written, are accurately followed and adhered to.
- Appropriate equipment and materials are identified and selected according to work site procedures and statutory requirements.
- Purpose of determining a sequence of operation is explained.
- Consequences of not monitoring treatment and enhancement and taking corrective actions are explained.
- Purpose of preparing the work area is explained.
- Reasons for adhering to safety and quality procedures.

**SPECIFIC OUTCOME 2**

*Treat or enhance seed.*

**OUTCOME NOTES**

Preparing chemicals according to work site procedures and statutory requirements.
- Setting and operating appropriate equipment according to work site and safety procedures.
- Monitoring and controlling the treatment and enhancement process and taking corrective actions (when applicable) according to work site, quality and safety procedures.

**ASSESSMENT CRITERIA**

**ASSESSMENT CRITERION 1**

Assessors will observe, confirm and evaluate evidence that will indicate that learners have demonstrated competence in each of the specific outcomes. In this unit standard the following specific criteria should be used:
- Job instructions, oral or written, are accurately followed and adhered to.
- Appropriate equipment and materials are identified and selected according to work site procedures and statutory requirements.
- Purpose of determining a sequence of operation is explained.
- Consequences of not monitoring treatment and enhancement and taking corrective actions are explained.
- Purpose of preparing the work area is explained.
- Reasons for adhering to safety and quality procedures.

**SPECIFIC OUTCOME 3**

*Complete treatment and enhancement process.*

**OUTCOME NOTES**

Identifying treated and enhanced seed according to work site procedures.
- Acquiring a sample of and distributing treated and enhanced seed according to work site procedures.
- Forwarding treated and enhanced seed according to work site procedures.
- Restoring work area according to work site procedures, safety regulations and statutory requirements.
- Completing of all relevant documentation according to work site procedures and statutory requirements.
- Informing relevant parties according to work site procedures.

**ASSESSMENT CRITERIA**

**ASSESSMENT CRITERION 1**

Assessors will observe, confirm and evaluate evidence that will indicate that learners have demonstrated competence in each of the specific outcomes. In this unit standard the following specific criteria should be used:
- Job instructions, oral or written, are accurately followed and adhered to.
Appropriate equipment and materials are identified and selected according to work site procedures and statutory requirements.

Purpose of determining a sequence of operation is explained.

Consequences of not monitoring treatment and enhancement and taking corrective actions are explained.

Purpose of preparing the work area is explained.

Reasons for adhering to safety and quality procedures.

UNIT STANDARD ACCREDITATION AND MODERATION OPTIONS (Mechanisms and bodies for external moderation of learner achievements)

- An individual wishing to be assessed against this unit standard may apply to an assessor accredited by SETASA.
- Any training provider offering learning that will enable achievement of this unit standard must be registered and accredited by SETASA.
- Moderation of assessment will be done by SETASA in its ETQA capacity at its discretion.

UNIT STANDARD ESSENTIAL EMBEDDED KNOWLEDGE (Knowledge that will help me understand and that I will be able to explain)

- Basic knowledge of the safe handling of equipment related to the treatment and enhancement of seed.
- Basic knowledge of maintenance and caring for relevant equipment.
- Operating instructions of treating and enhancing equipment.
- Knowledge of relevant quality determination in seed.
- Knowledge of treatment and enhancement theory and methods.
- Appropriate computer operational skills.

Critical Cross-field Outcomes (CCFO):

UNIT STANDARD CCFO IDENTIFYING Identify and solve problems when monitoring the treatment and enhancing process and changing operational settings.

UNIT STANDARD CCFO WORKING Work effectively with others when receiving information and giving instructions during the treating and enhancing process.

UNIT STANDARD CCFO ORGANIZING Organise and manage oneself when planning and performing the treating and enhancing process.

UNIT STANDARD CCFO COLLECTING Collect, analyse, organise and critically evaluate information by identifying and selecting appropriate equipment.

UNIT STANDARD CCFO COMMUNICATING Communicate with others during the process of giving and receiving instructions.

UNIT STANDARD CCFO SCIENCE Use science and technology when operating treating and enhancing equipment.
All learners should demonstrate:

- An application of company ethics, values as well as general safety and customer care principles.
- An awareness of expectations and obligations of basic worker / management / customer relationships.