ANALYSE PHYSICAL PURITY OF SEED

A Unit Standard for the Seed Industry

Unit Standard 114687
NQF Level 3
Credits: 11

Compiled by:
Michael Zingel, Peter Froneman & Bredenkamp Bruwer

Learner Name:
Learner Number:
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# Unit Standard Specific Outcomes

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<tr>
<th>US: Analyse physical purity of seed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unit Standard Specific Outcomes</strong></td>
</tr>
<tr>
<td><strong>SO1</strong> Prepare the work area for analysis.</td>
</tr>
<tr>
<td><strong>SO2</strong> Prepare working sample and relevant documentation.</td>
</tr>
<tr>
<td><strong>SO3</strong> Analyse and retain components of working sample.</td>
</tr>
<tr>
<td><strong>SO4</strong> Retention of submitted sample.</td>
</tr>
<tr>
<td><strong>SO5</strong> Complete physical seed purity analysis process.</td>
</tr>
</tbody>
</table>
UNIT 1: ANALYSE PHYSICAL PURITY OF SEED

1.1.1 Introduction

The International Seed Testing Association (ISTA) is an international non-profit association whose primary purpose is to develop, adopt and publish standard procedures for sampling and testing seeds laboratories for both governmental and private in over 70 countries, and to promote uniform application of these procedures for evaluation of seeds moving in international trade. ISTA publishes the International Rules for Seed Testing, Seed Science and Technology and a wide range of handbooks including detailed techniques on all relevant topics in seed sampling and testing methodology. More information is available on ISTA's web site at www.seedtest.org.

1.2 Standard Purity test

The purpose of Purity Testing is typically to visually examine samples of seed and to separate samples of seed into components of pure crop seed, other seed (other crop seed and weed seed) and inert matter (stones, dirt, leafage, stems, badly broken seed, etc.); identify each component part found in the examination; weigh each component part of test sample on mechanical or electronic scale; compute percentage part of total sample of each component found; record findings on pre-printed test record form or card; and route completed sample to supervisor who checks for accuracy if necessary (according to worksite procedure).

The objective of the purity analysis is to quantify pure seed, other seed and impurities. An important aspect is to determine whether the submitted seed sample conforms to the prescribed quality standards in regards to purity components and is a true reflection of the seed lot it represents.

The purity analysis is done on the working samples of prescribed weight drawn from a submitted sample. The submitted sample is obtained by drawing primary samples from a seed lot, combining them, and then drawing the submitted sample. The analysis may be made on one working sample of the prescribed weight or on two sub-samples of at least half this weight, each independently drawn.

The number of decimal places to which the working sample and the components of the working sample should be weighed is given below:
<table>
<thead>
<tr>
<th>Weight of the working sample in gram</th>
<th>The number of decimal places to which the working sample and its components should be weighed</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1</td>
<td>4</td>
<td>0.7534</td>
</tr>
<tr>
<td>1 to 9.9999</td>
<td>3</td>
<td>7.534</td>
</tr>
<tr>
<td>10 to 99.99</td>
<td>2</td>
<td>75.34</td>
</tr>
<tr>
<td>100 to 999.9</td>
<td>1</td>
<td>753.4</td>
</tr>
<tr>
<td>1000 or more</td>
<td>0</td>
<td>7534</td>
</tr>
</tbody>
</table>

### 1.2.1 Components of Purity test

**Pure Seed:** The pure seed means the seeds of kind/species stated by the sender, or found to predominate in the test. It includes all botanical varieties and varieties of that kind/species. The seed unit is the structure usually regarded as a seed in planting and in commercial channels. There are many natural structures that adhere to a true seed creating a unit that is much more that just a botanical seed. The rules for testing seeds describe what structures should remain attached and which are to be separated. Pure seed is obtained from the purity working sample which by definition includes all pure seed units of each kind and/or cultivar under consideration which are present in excess of 5% of the whole.

A pure seed unit does not have to be alive and able to produce a plant to be classified as pure seed because the planting value of the seed unit is determined during the germination test. Pure seed units include pieces of broken and otherwise damaged seeds larger that one half of the original size. A broken seed unit larger that one half the original size is classified as pure seed even if the unit does not contain an embryo. Therefore pure seed includes immature, diseased, shrivelled seeds and seeds that are cracked of otherwise damaged. This does not include seeds of legumes, crucifers, and conifers with their seed coats entirely removed. Insect damaged seeds are pure provided more than half the original size is determined, or when the opening in the seed coat is not sufficiently large to allow the size of the remaining tissue to be readily apparent.

**Other Crop Seed:** It relates to the kinds of crops other than the kind being examined.

**Weed Seed:** It includes seeds of those species normally recognised as weeds or specified under a regulation of the Seed Act as a noxious weed.
Inert Matter: Inert matter includes seed units and all other matter and structures that are not defined as pure seed. Examples of non-seed unit inert matter are soil particles, sandstones, chaff, stems, leaves, flowers, cone scales, pieces of bark, *sclerotia, *nematode galls, pieces of resin, etc. Inert matter from pure seed units and other crop seed units may include pieces of broken and damaged seed units, which are half the original size or less. Seed which are botanically fruits in which it is readily apparent that no true seed is present. “Readily apparent”, means that no special equipment or means of detection is used to determine the presence of a seed/caryopsis. If such a determination cannot be readily made the unit is classed as pure seed. Seed which have been transformed into nematode galls or fungal bodies such as sclerotia or smut balls are classed as inert matter. Seeds of the Fabaceae and Brassicaceae family with their testa entirely removed. Appendages not mentioned in the pure seed must be removed and included in the inert matter fraction. Seeds of *Cuscuta* spp. which are fragile or ashen grey to creamy white in colour. For the Graminae family, florets with a caryopsis without endosperm. For certain other species the caryopsis less than one third the length of the palea measured from the base of the rachilla.
1.2.2 Seed Testing Equipment

Purity board

This is the principal instrument for the purity test. The purity board is constructed from a solid material giving it a hard surface (preferably glass, with rounded edges). The covering of the purity board should have a painted surface (light to medium green or blue is recommended to provide a suitable contrast to the seed and not cause strain to the eye). If covered with paper, when working with water, it will become water damaged and require regular replacing. A mechanical purity board maximises the optimum number of seed in the technologist's field of view. It moves the seed past the seed technologist field of view via a belt on a vibrating platform. The purity board is placed on a table or desk of a suitable size and height as to avoid back strain. It is recommended that the table or desk have an incision into which the analyst, with chair can sit. This will provide the necessary elbow support when working. The chair is to be of a suitable height. For the larger seed kinds for example, maize, peas, beans etc, it is recommended to use a suitably sized seed pan in which to do the separation.

Diaphanoscope

This device directs a strong beam of light through a piece of glass over which the seed are examined. The purpose of the light is to penetrate plant and fruit parts surrounding the seed to determine the presence and size of caryopsis.

Seed Blowers

Seed blowers are mechanical devices used to separate particles of different size, weight, or shape. Several types of seed blowers have been developed, with most used in grass seed purity testing. A seed blower can be used either to aid in the purity analysis separation or as a requirement for certain grass species as per ISTA Rules. Normally the sample is blown several times, increasing the air pressure each time until all the lightweight material is removed from the heavier fraction. Every lightweight fraction from each blowing is examined for pure seed units, other crop seed units, inert matter and weed seed units (the blowing method for certain grass seed kinds differs from above mentioned procedure, refer to ISTA Rules as specified). The heavy fraction remaining at the end of the blowing process is then subjected to a purity test and all the components from the lightweight fractions are combined with the appropriate components from the heavy fraction. A record should be made of the air value openings used for the different kinds of seeds.
Scales and balances

Typically a seed laboratory requires two types of scales: one that has a capacity of at least 1.000 grams and is precise to one decimal place (precision balance) and one that is precise to four decimal places (analytical balance). Test weights should be available to calibrate the scales (on a daily basis) and the scales should be placed on a solid, level surface that is not subject to vibration. Always check at the beginning of each weighing that the scale is level and tared.

Hand tools

The hand tools necessary for the purity test are forceps, scalpels, insect pins and surgical blades (for scalpels). Very fine pinned forceps are needed to pick up, move, or dissect small seeds and inert objects.
Sieves

Sieves separate components of different sizes into fractions. Each fraction must be examined and all the particles classified into the proper component. Sieves come in different sizes and shapes, and their mesh openings vary in size and shape. The openings in the mesh can be round, triangular, rectangular or oval slotted. A sieve vibrator deck allows the analyst to perform other tasks while the sample is being vibrated into size fractions.

Magnifiers and Microscopes

Many purity samples require magnification. Hand held magnifiers with a 2x magnifying lens with lamp, flexible spring counter balance arm, and heavy base are pieces of equipment the can be used over a purity board or over large sieves.

Figure 2: Seed magnifier 2x

A swing arm stereoscopic microscope with an inclined ocular and a wide-field magnification range is essential for the analysis of many seed units.

Figure 3: Microscope
1.3 Conducting the test

Before conducting any test, always make sure that work surfaces, test equipment etc. is clean and free from any kind of contaminants. Regularly clean all work surfaces and equipment with 90% alcohol for sterilisation. Place the working sample (or sub sample) on the clean surface of a purity work board and do the following:

1. Examine the sample to determine whether it conforms to the variety/species name under which it has been submitted. The file samples (authentic samples of the same variety) maintained in the seed herbarium are of great value in making this decision. In case of any doubt the sample under examination may be compared with the file samples of the same variety/species.

2. Examine the sample to determine whether it contains small inert matter which could be removed by sieving.

3. Examine the sample to determine whether it contains light weight material which may be removed by blowing.

If small inert matter is present which can be removed by sieving or a preliminary blowing, use the appropriate sieve or blower setting to separate it. If the light weight material is present blow the sample until all the light weight material is removed from the heavy fraction. To correctly evaluate the four components in a purity working sample, the learner must be familiar with the peculiarities of the specific crop type and anticipated impurities, defects and irregularities according to the operational procedures (ISTA Rules) and work site procedures.

Figure 4: Purity test laboratory
1.3.1 Calculation of Results

The percentage by weight of each of the component parts should be calculated to the decimal places prescribed in the work site procedures and ISTA requirements.

Example of purity test results:

Purity working sample original weight: 5.131 grams

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight Original</th>
<th>Weight Purity</th>
<th>Purity</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pure seed</td>
<td>5.001 gr</td>
<td>5.001 ÷ 5.128</td>
<td>97.52%</td>
<td>97.5%</td>
</tr>
<tr>
<td>Other crop seed</td>
<td>0.0028 gr</td>
<td>0.028 ÷ 5.125</td>
<td>0.55%</td>
<td>0.6%</td>
</tr>
<tr>
<td>Inert matter</td>
<td>0.098 gr</td>
<td>0.098 ÷ 5.128</td>
<td>1.91%</td>
<td>1.9%</td>
</tr>
<tr>
<td>Weed seed</td>
<td>0.001 gr</td>
<td>0.001 ÷ 5.128</td>
<td>0.02%</td>
<td>TR</td>
</tr>
<tr>
<td>Sum of the components weight</td>
<td>5.128 gr</td>
<td></td>
<td>100.00%</td>
<td>100%</td>
</tr>
</tbody>
</table>

1.3.2 Reporting results

The result of a purity analysis shall be given to one decimal place and the percentage of all components must total 100. Components of less than 0.05% shall be reported as ‘Trace’. The percentage of pure seed, other crop seed, weed seed and inert matter must be reported in the spaces provided on the Analysis Certificate. If the result for a component is nil, this must be shown as ‘0.0’ in the appropriate space.

Laboratory reports of purity analysis performed in accordance with the rules should include:

1. Name and address of the issuing laboratory
2. Name of responsible individual
3. Laboratory test sample number
4. Date report of analysis is issued
5. Application information, such as kind of seed, cultivar, lot number, lot size, certification number, treatment, etc.
6. Kind of pure seed by common name as cited in the Plant Improvement Act
7. If submitted sample is treated, inoculated, film coated, coated, encrusted, or pelleted
8. Weight of purity working sample
9. Percentage by weight of pure seed, other crop seed, inert seed, inert matter and weed seed, given to two decimal places

10. Scientific name or common name, or both, of all other crop seed or weed including noxious weed seed found in the purity test. If none is found, this must be indicated.

1.3.3 Clean-up

Whenever a seed sample comes in contact with any surface it is possible for contamination to occur. A strong blast of air is ideal to remove all foreign particles from the working surfaces. Portable electric air blowers and hand brushes are also suitable for cleaning. After every test, all surfaces that come in contact with the sample must be thoroughly cleaned.

1.4 Other Examinations

1.4.1 Noxious seed weed

A noxious seed weed is a plant propagule that is specified by law as being especially undesirable, troublesome and difficult to control. This examination consists of removing only noxious weed seeds units form a specified sample size that provides approximately 25 000 units. The noxious weed seed are counted and their number and kind recorded.

1.4.2 Bulk examination

This examination is conducted to determine particular components in the sample. The component may be seeds of selected species or particles of certain inert matter. The rate of occurrence may be expressed as the number of seeds or particles per unit weight of as percentage by weight.

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

CHAPTER II

Requirements for test laboratories

8A.(1) Any premises on which the business of a test laboratory is conducted, may be registered as an establishment and the registration thereof be renewed if -

(a) the place where samples of plants and propagating material are stored, tested, examined or analysed on the premises concerned -

(i) has a solid floor;

(ii) has efficient lighting so that any marks, printing or writing on containers of samples or on labels attached to such samples may readily be read, and that observations in connection with the tests, examinations or analyses concerned may readily be made; and

(iii) is kept in an orderly, tidy and clean condition at all times; and

(b) the available facilities and equipment at the premises concerned are adequate and sufficient to ensure that the tests, examinations and analyses referred to in subregulation (2), of samples of the kinds of plants and propagating material referred to in that subregulation can be performed properly.

(2) The testing, examination or analysis of samples of plants and propagating material at a test laboratory which is registered as an establishment shall -

(a) be restricted to samples of those kinds or plants and propagating material, and to those kinds of examinations, tests and analyses which are specified in the certificate of registration mentioned in respect thereof; and

(b) be performed in accordance with such methods as the registrar may determine.

(3) The registrar may require the owner or occupier of a test laboratory for plants and propagating material which is registered as an establishment to carry out referee tests with samples of plants and propagating material with such instructions as the registrar may issue.

(4) The owner or occupier of a test laboratory for plants and propagating material which is registered as an establishment shall furnish a report which complies with the requirements referred to in regulation 12A(1), in connection with the testing, examination or analysis of each sample to the person to whom that sample has been submitted.

(5) The owner or occupier of a test laboratory for plants and propagating material which is registered as an establishment shall keep at that establishment a quantity of each sample which was tested, examined or analysed there, and which is sufficient in order to repeat that test, examination or analysis -

(a) in the case of plants, tubers or bulbs for a period of at least three months after the test, examination or analysis concerned has been completed, and stored under conditions in which the samples concerned will not be destroyed or affected by any organism; and
(b) in the case of seed for a period of at least 12 months after the test, examination or analysis concerned has been completed, and stored under conditions in which the seed will retain its potential to germinate.

(6) The owner or occupier of a test laboratory for seed that has been registered as an establishment, shall -

(i) employ a seed analyst who is in possession of the necessary qualifications, as determined by the Registrar, as responsible officer of the test laboratory; and

(ii) immediately notify the Registrar as soon as the services of such analyst is no longer available.

[Subregulation (6) inserted by R. 1590 of 27 August 1993]

[Regulation 8A inserted by R. 1621 of 22 July 1983 and substituted by R. 2119 of 24 July 1992]

Chapter III

Records at test laboratories

12A.(1) The owner or occupier of an establishment at which the business of a test laboratory is conducted, shall in respect of each sample of plant and propagating material handled there, compile a report which contains at least the following particulars:

(a) the date on which the sample concerned was received;

(b) the kind of plant or propagating material of the sample concerned as indicated by the person by whom it was submitted;

(c) the name and address of the person by whom the sample concerned was submitted for testing, examination or analysis;

(d) the reference numbers respectively allocated to the sample concerned by the person referred to in paragraph (c) and the owner or occupier of the establishment concerned;

(e) the respective dates on which the testing, examination or analysis of the sample has commenced and was completed;

(f) the result of the testing, examination or analysis of the sample concerned, in which the following applicable particulars shall be indicated:

(i) in the case of plants, tubers or bulbs -

(A) the method used to carry out the test, examination or analysis on the sample concerned;

(B) the part of the plant, tuber or bulb which was tested, examined or analysed;

(C) the type of organism tested, examined or analysed for;

(D) kind of contamination found;

(E) any remarks which the person who has performed the test, examination or analysis concerned, wishes to make in connection with the result concerned; and

(F) the name of the person who carried out the tests; and
(ii) in the case of seed -

(A) the physical purity, expressed as a percentage by mass and recorded in the manner specified in Part E of the form set out in Schedule H;

(B) the germination or viability, where applicable, expressed as a percentage by number and recorded in the manner specified in Part F(i) or F(ii), where applicable, of the form set out in Schedule H;

[Paragraph (B) substituted by R. 174 of 10 February 1995]

(C) the number of days in which germination was achieved;

(D) moisture content, expressed as a percentage by mass; and

(E) any remarks which the person who has performed the test, examination or analysis concerned, wishes to make in connection with the result concerned.

(2) Such owner or occupier shall keep a copy of each such report.

[Regulation 12A inserted by R. 1621 of 22 July 1983 and substituted by R. 2119 of 24 July 1992]

1.1 SCHEDULE H

REPORT OF TEST, EXAMINATION OR ANALYSIS OF SEED

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>IDENTIFICATION MARK ON LABEL OF SAMPLE:………………………………………………………</td>
</tr>
<tr>
<td>B.</td>
<td>NAME OF ESTABLISHMENT OR OWNER OR CUSTODIAN OF SEED:………………………………………</td>
</tr>
<tr>
<td>C.</td>
<td>REFERENCE NUMBER OF TEST, EXAMINATION OR ANALYSIS:…………………………………………</td>
</tr>
<tr>
<td>D.</td>
<td>* PARTICULARS OF SEED IN RESPECT OF KIND, VARIETY, POLLINATOR:</td>
</tr>
<tr>
<td></td>
<td>Kind of seed:..................................................................................................................</td>
</tr>
<tr>
<td></td>
<td>Variety:..........................................................................................................................</td>
</tr>
<tr>
<td></td>
<td>Percentage pollinator:....................................................................................................</td>
</tr>
</tbody>
</table>
E. PARTICULARS OF PHYSICAL PURITY:

1. Percentage pure seed (or in the case of coated seed, percentage pure units of coated seed): ..........................................................................................................................

2. Percentage other seed:
   2.1 Percentage other crop seed: ...........................................................................
       Specify: ..............................................................................................................
   2.2 Percentage weed seed: ..................................................................................
       Specify: ..............................................................................................................
       Total (2.1 + 2.2): ..........................................................................................

3. Percentage inert matter: ..................................................................................

4. Percentage other material (Total of 2 and 3): ..............................................

5. Number of prohibited weed seeds per mass: ..............................................

F(1). * PARTICULARS OF GERMINATION OF SEED:

Percentage normally germinated: ........................................................................

Percentage hard seeds: ................................................................................................

Percentage of healthy seeds not germinated: ..................................................
<table>
<thead>
<tr>
<th>Percentage mouldy seeds:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage abnormal seeds:</td>
<td></td>
</tr>
<tr>
<td>Other (specify):</td>
<td></td>
</tr>
</tbody>
</table>

**F(2) PARTICULARS OF VIABILITY OF SEED:**

<table>
<thead>
<tr>
<th>Percentage viable:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage negatively stained:</td>
<td></td>
</tr>
<tr>
<td>Percentage unstained:</td>
<td></td>
</tr>
</tbody>
</table>

**G. PARTICULARS OF PLANTS:**

<table>
<thead>
<tr>
<th>Percentage of kind:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of variety:</td>
<td></td>
</tr>
<tr>
<td>Percentage of deviation:</td>
<td></td>
</tr>
<tr>
<td>Percentage hybrid plants:</td>
<td></td>
</tr>
<tr>
<td>Percentage pollinator plants:</td>
<td></td>
</tr>
<tr>
<td>Description of deviations:</td>
<td></td>
</tr>
</tbody>
</table>
H. PARTICULARS OF OTHER ANALYSIS:………………………………………………………………………………

Name of officer who did analysis:…………………………………………………………………………………………

I hereby declare that –

(a) a sample of seed which was identified as specified in paragraph A above was received by me;
(b) such sample was tested, examined and analysed in accordance with the methods determined by the registrar; and
(c) the result of the test, examination and analysis concerned has been recorded in the applicable spaces at paragraphs D, E, F, G and H above.

……………………………………………   ………………………………………
Signature of officer    Date

* In the case of a mixture, the kinds and varieties present therein and the percentage contents of each, shall be specified.

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)
www.seedtest.org
www.aosaseed.com
www.seedburo.com
ISTA Rules
ANNEXURE 3: UNIT STANDARD

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<table>
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<th>SAQA US ID</th>
<th>UNIT STANDARD TITLE</th>
</tr>
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<tbody>
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<td>114687</td>
<td>Analyse physical purity of seed</td>
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<table>
<thead>
<tr>
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<th>NSB</th>
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<th>REGISTRATION END DATE</th>
<th>SAQA DECISION NUMBER</th>
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<td>2004-08-11</td>
<td>2007-08-11</td>
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</tbody>
</table>
PURPOSE OF THE UNIT STANDARD
A learner who has achieved this unit standard will be competent in:
Analysing the physical purity of a seed lot to determine 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:
Understanding of general safety in the work place at NQF level 2.
Literacy, numeracy and communication at NQF level 3.
Introduction to seed industry and relevant workplace.
Basic computer literacy.

UNIT STANDARD RANGE
General guide for scope, context and level
The learner is expected to perform the specific outcomes as reflected in this unit standard without direct supervision, but with access to work-site procedures, operating instructions and statutory requirements.
The learner is expected to be able to analyse the physical purity of the kinds of seed included in the work site procedure.
Submitted sample is limited to the prescribed operational procedure.
Working sample includes, but is not limited to components of the working sample as prescribed in the operational procedure.
Operational procedures are limited to International Seed Testing Association (ISTA) Rules.
Equipment refers to but is not limited to microscope, mass meter and magnifying lamp.

Specific Outcomes and Assessment Criteria:

SPECIFIC OUTCOME 1
Prepare the work area for analysis.

OUTCOME NOTES
Cleaning and sterilising work area and equipment according to work site procedures and operational procedures.
Identifying and selecting appropriate equipment according to operational procedures and work site procedures.
Reporting any deviations with regards to appropriate equipment.

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
Consequences of not sub-sampling accurately according to the operational procedures are explained.
Consequences of not using correct sanitary practices according to work site procedures are explained.
Consequences of not identifying and reporting findings accurately according to the operational procedures and work site procedures are explained.
The possible effects of hazardous seed treatment material on the learner are explained.

The importance of using the correct equipment during analysis according to work site procedures is explained.

The importance of keeping the different components according to the operational procedures and work site procedures is explained.

The importance of retaining the sample and prescribed records according to the operational procedures, work site procedures and statutory requirements is explained.

**SPECIFIC OUTCOME 2** Prepare working sample and relevant documentation.

OUTCOME NOTES Acquiring the submitted sample according to work site procedures and statutory requirements.

Preparing relevant documentation to record findings according to work site procedures and statutory requirements.

Reducing submitted sample to obtain the working sample according to the operational procedures and work site procedures.

Familiarising with the peculiarities of the specific crop type and anticipated impurities, defects and irregularities according to the operational procedures and 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

Consequences of not sub-sampling accurately according to the operational procedures are explained.

Consequences of not using correct sanitary practices according to work site procedures are explained.

Consequences of not identifying and reporting findings accurately according to the operational procedures and work site procedures are explained.

The possible effects of hazardous seed treatment material on the learner are explained.

The importance of using the correct equipment during analysis according to work site procedures is explained.

The importance of keeping the different components according to the operational procedures and work site procedures is explained.

The importance of retaining the sample and prescribed records according to the operational procedures, work site procedures and statutory requirements is explained.

**SPECIFIC OUTCOME 3** Analyse and retain components of working sample.

OUTCOME NOTES Identifying and weighing the relevant components according to the operational procedures and work site procedures.

Packaging and labelling components separately and retain according to work site-, operational procedures and statutory requirements.

Recording and reporting findings and deviations according to work site procedures, operational procedures and statutory requirements.
Completing documentation according to the operational procedures and work site procedures and 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:

Consequences of not sub-sampling accurately according to the operational procedures are explained.

Consequences of not using correct sanitary practices according to work site procedures are explained.

Consequences of not identifying and reporting findings accurately according to the operational procedures and work site procedures are explained.

The possible effects of hazardous seed treatment material on the learner are explained.

The importance of using the correct equipment during analysis according to work site procedures is explained.

The importance of keeping the different components according to the operational procedures and work site procedures is explained.

The importance of retaining the sample and prescribed records according to the operational procedures, work site procedures and statutory requirements is explained.

**SPECIFIC OUTCOME 4** Retention of submitted sample.

**OUTCOME NOTES** Placing the working sample in the container with the submitted sample according to work site and operational procedures.

Storing the submitted sample in a designated area for additional analysis according to work site procedures and 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:

Consequences of not sub-sampling accurately according to the operational procedures are explained.

Consequences of not using correct sanitary practices according to work site procedures are explained.

Consequences of not identifying and reporting findings accurately according to the operational procedures and work site procedures are explained.

The possible effects of hazardous seed treatment material on the learner are explained.

The importance of using the correct equipment during analysis according to work site procedures is explained.

The importance of keeping the different components according to the operational procedures and work site procedures is explained.

The importance of retaining the sample and prescribed records according to the operational procedures, work site procedures and statutory requirements is explained.
SPECIFIC OUTCOME 5
Complete physical seed purity analysis process.

OUTCOME NOTES
Restoring work area according to work site procedures.
Completing and retaining documentation and informing relevant parties according to work site procedures and 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:

- Consequences of not sub-sampling accurately according to the operational procedures are explained.
- Consequences of not using correct sanitary practices according to work site procedures are explained.
- Consequences of not identifying and reporting findings accurately according to the operational procedures and work site procedures are explained.
- The possible effects of hazardous seed treatment material on the learner are explained.
- The importance of using the correct equipment during analysis according to work site procedures is explained.
- The importance of keeping the different components according to the operational procedures and work site procedures is explained.
- The importance of retaining the sample and prescribed records according to the operational procedures, work site procedures and statutory requirements is explained.

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
General knowledge of the differences between impurities, physically pure seed, defects and irregularities.
Knowledge and theory of operation of microscopes and mass meters.

Critical Cross-field Outcomes (CCFO):
UNIT STANDARD CCFO IDENTIFYING
Identify and report deviations by determining physical purities in seed.
UNIT STANDARD CCFO WORKING Work effectively with others with whom the relevant function interfaces.

UNIT STANDARD CCFO ORGANIZING Organise and manage oneself when preparing for analysis of physical purity of seed.

UNIT STANDARD CCFO COMMUNICATING Communicate with others in the process of the analysis of physical purity of seed.

UNIT STANDARD CCFO DEMONSTRATING Understand the world as a set of related systems in appreciating the importance of accurate analysis, identification of impurities, irregularities and defects and the consequences of not reporting these with regard to the analysis of physical purity of seed.

UNIT STANDARD NOTES

Values (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 and industrial relationships.