

# FINAL DRAFT UGANDA STANDARD

FDUS EAS 822

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## Sorghum seed — Requirements for certification

DRAFT UGANDA STANDARD ON PUBLIC REVIEW



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DRAFT UGANDA STANDARD ON PUBLIC REVIEW

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The work of preparing Uganda Standards is carried out through Technical Committees. A Technical Committee is established to deliberate on standards in a given field or area and consists of representatives of consumers, traders, academicians, manufacturers, government and other stakeholders.

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

This Final Draft Uganda Standard, FDUS EAS 822: 2014, *Sorghum seed — Requirements for certification*, is identical with and has been reproduced from an East African Standard, EAS 822: 2014, *Sorghum seed — Requirements for certification*, and adopted as a Uganda Standard.

Wherever the words, "East African Standard" appear, they should be replaced by "Uganda Standard."



## **FINAL DRAFT EAST AFRICAN STANDARD**

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**Sorghum seed — Requirements for certification**

**EAST AFRICAN COMMUNITY**

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## Foreword

Development of the East African Standards has been necessitated by the need for harmonizing requirements governing quality of products and services in the East African Community. It is envisaged that through harmonized standardization, trade barriers that are encountered when goods and services are exchanged within the Community will be removed.

In order to achieve this objective, the Community established an East African Standards Committee mandated to develop and issue East African Standards.

The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the private sectors and consumer organizations. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalization of standards, in accordance with the procedures of the Community.

East African Standards are subject to review, to keep pace with technological advances. Users of the East African Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

FDEAS 822 was prepared by Technical Committee EASC/TC/012, *Seeds and propagation material*

## Sorghum seed — Requirements for certification

### 1 Scope

This Final Draft East African Standard specifies the certification requirements for the production of pre-basic, basic and certified seed of sorghum (*Sorghum bicolor* (L.) Moench). It includes requirements for eligible varieties, field standards, field inspections, seed sampling, laboratory standards, certificates, packaging and labelling, and post control tests.

### 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

*International Seed Testing Association Rules*

*OECD Seed Schemes: Guidelines for Control Plot Tests and Field Inspection of Seed Crops*

*OECD Schemes for Varietal Certification or the Control of Seed Moving in International Trade*

*UPOV Test guidelines for sorghum*

### 3 Terms and definitions

For the purposes of this standard, the terms and definitions given in ISTA, UPOV and OECD and the following shall apply.

#### 3.1

##### **seed test certificate**

legal document issued by the national seed certification authority, which states that a seed lot has met the requirements set in this standard

#### 3.2

##### **distinctness**

variety is deemed to be distinct if it is clearly distinguishable in at least one character from any other variety whose existence is a matter of common knowledge at the time of filing the application for registration.

#### 3.3

##### **field**

defined and identifiable area of land or facility that is used to produce a seed crop under the Seed Certification Scheme

#### 3.4

##### **field inspection**

inspection of a field and or seed crop by an inspector to confirm that the minimum requirements for seed certification have been satisfied

#### 3.5

##### **field number**

number assigned to the field when the application form for certification is submitted



### **3.6**

#### **germination**

emergence and development of a seedling to a stage where the aspect of its essential structures indicates whether or not it is able to develop further into a satisfactory plant under favourable conditions in field

### **3.7**

#### **grower**

person or entity registered to produce seed

### **3.8**

#### **hybrid variety**

type of variety produced by the controlled crossing of parent lines in a way prescribed by the breeder or maintainer

### **3.9**

#### **inert matter**

seed units and all other matter and structures not defined as pure seed or other seeds

### **3.10**

#### **isolation**

minimum distance or time between two crops of sorghum that is required to prevent contamination either mechanically or by cross pollination

### **3.11**

#### **inspector**

authorized official or accredited entity responsible for carrying out seed certification activities

### **3.12**

#### **international seed testing association (ISTA) rules**

rules for seed testing published by the International Seed Testing Association

### **3.13**

#### **label**

tag or other device that is attached to or written, stamped or printed on any container of seed or that accompanies any lot of bulk seed and which describes the kind of seed and any other information required by law

### **3.14**

#### **previous cropping**

minimum period (seasons or years) that must elapse between the production of a crop of the same or a closely-related species in a field and the production of a crop entered in the certification scheme in the same field

### **3.15**

#### **maintainer**

person or organisation responsible for the production or maintenance of a bred variety included in a national list of varieties eligible for certification, and ensure that the variety remains true to type throughout its full life-span and in the case of hybrid varieties, that the formula for hybridisation is followed.

### **3.16**

#### **national seed certification authority**

national authority responsible for conducting seed certification processes

### **3.17**

#### **noxious weed**

weed species, the seed of which is difficult to separate during processing or has undesirable effects on the crop produced, for example by possible genetic contamination

### **3.18**

#### **off-type**

plant of the same species which does not exhibit the recognised and accepted habit and characteristics of the variety being grown

### **3.19**

#### **open pollinated variety (OPV)**

variety that is normally produced by natural (un-controlled) pollination

### **3.20**

#### **other seeds**

seeds of any plant species other than that of the crop sample that is being tested. They consist of weed seeds and other crop seeds

### **3.21**

#### **parental material**

population or lines used by a breeder to maintain a variety

### **3.22**

#### **person**

natural person or legal entity

### **3.23**

#### **post-control plot**

small plot where a representative sample of a seed lot is grown to determine the identity and purity of a variety to confirm that the seed certification system is operating satisfactorily

### **3.24**

#### **pure seed**

species stated by an applicant, or found to predominate in a test, and includes all botanical varieties and cultivars of that species, including intact seeds and pieces of seed units larger than one-half their original size

### **3.25**

#### **variety registration**

recording of a new variety in a national variety list/catalogue when it has been tested and satisfied the requirements for distinctness, uniformity, stability, and has value for cultivation and use

### **3.26**

#### **rogueing**

removal by hand of off-types, other varieties, and diseased or any other unwanted plants from a seed crop if they may reduce the quality of the harvested crop

### **3.27**

#### **seed certification**

process by which the quality and identity of a seed lot is assured to the purchaser by attaching an official certification label to the package

### **3.28**

#### **seed lot**

defined quantity of seed bearing the same reference number and for which the origin, production history and identity is known

### **3.29**

#### **stability**

condition of a variety distinguishing characteristics to remain unchanged after repeated growing cycles

### **3.30**

#### **uniformity**

variety is deemed to be uniform if, subject to the variation that may be expected from the particular features of its propagation, it is sufficiently uniform in its relevant characteristics

### **3.31**

#### **variety**

assemblage of cultivated plants that is clearly distinguished from other varieties by any characters (morphological, physiological, cytological, chemical, or others) and which retains its distinguishing characteristics when reproduced by the normal means for the crop and variety

### **3.32**

#### **variety list/catalogue**

list of varieties that have been registered by a national authority and can be produced and marketed as certified seed

### **3.33**

#### **carryover seed**

seed produced in previous season and stored for one or more cropping season

### **3.34**

#### **pre-basic seed**

seed that is derived from breeder seed and is used to produce basic seed through one cycle of multiplication

### **3.35**

#### **basic seed**

seed that has been produced from breeder or pre-basic seed under the responsibility of the breeder and is used for the production of certified seed

### **3.36**

#### **certified seed**

seed that is produced from basic seed through one or two generations of multiplication

#### **3.36.1**

##### **certified seed 1st generation**

first generation of seed derived from basic seed

#### **3.36.2**

##### **certified seed 2nd generation**

certified seed, 1st generation which is multiplied once

## **4 Symbols (and abbreviated terms)**

- DUS: Distinctness, Uniformity and Stability
- ISTA: International Seed Testing Association
- OECD: Organization for Economic Co-operation and Development.
- UPOV: International Union for the Protection of New Varieties of Plants

## **5 General requirements**

### **5.1 Eligible varieties**

**5.1.1** Key parameters required to implement this standard are the variety descriptors, the genetic purity of the seed sown, the field and laboratory standards and the post-control tests.

**5.1.2** Varieties eligible for seed certification shall be those that have been examined, tested and registered in at least one member country of EAC and are included in the national variety list/catalogue of that country. The country adopting the variety shall test it for at least one season.

**5.1.3** Examination of a candidate variety for registration shall be undertaken in accordance with the characters listed in Annex A. The official descriptor of the variety shall be made available for the national seed certification authority and its inspectors to check the identity and purity of the variety during field inspections.

**5.1.4** Each national seed certification authority shall keep the official descriptor of the varieties it has registered in hard and electronic copies and these shall be made available within EAC on request.

## **5.2 Inspection and laboratory testing**

**5.2.1** The minimum information for an application for certification of a seed crop shall include the following:

- a) name, address and contact details of the applicant;
- b) crop and variety to be sown;
- c) physical location;
- d) area and reference number of the field, and its cropping history for the past two cropping seasons;
- e) class of seed to be produced; and
- f) registration number of the grower.

**5.2.2** Information and records related to the previous cropping history, origin of seed planted, and field inspections shall be kept and used for certification to ensure full traceability of quality, genetic identity and purity of the seed harvested.

**5.2.3** The inspection of seed crops shall be done in accordance with *OECD Seed Schemes: Guidelines for Control Plot Tests and Field Inspection of Seed Crops*. If the field is found to be in conformity with the standards stated in Table 1 or Table 2 and is approved, the harvested seed shall be identified, transported, stored, and processed.

**5.2.4** The seed lot shall be sampled and tested in an official or authorized laboratory. The sampling and testing of seed lots shall be done in accordance with the relevant procedures described in the ISTA rules

**5.2.5** A seed lot that conforms to the standards set out in Table 3 or Table 4 shall be given a seed test certificate and a unique reference number to confirm its status under the certification scheme. One part of the seed sample shall be retained for sowing in a post-control plot in the next season, or earlier if that can be achieved using irrigation.

## **6 Seed classes**

For the purpose of this standard, the following classes of seed shall apply:

- a) Pre-basic seed;
- b) Basic seed; and
- c) Certified seed:
  - 1<sup>st</sup> generation; and
  - 2<sup>nd</sup> generation.

## 7 Field requirements

**7.1** Pre basic and basic seed shall be produced under the responsibility of the breeder or maintainer.

**7.2** Certified seed shall be produced in not more than two generations for OPVs and one generation for hybrids.

**7.3** The national seed certification authority shall inspect and certify the production of pre-basic, basic and certified seed crops.

**7.4** A field producing a seed crop of open-pollinated sorghum varieties shall be approved for certification if it complies with the requirements in Table 1.

**7.5** A field producing a seed crop of hybrid sorghum shall be approved for certification if it complies with the requirements in Table 2.

**7.6** Fields may be rejected for certification because of unsatisfactory conditions caused by noxious weeds, poor growth, poor stands, excessive disease presence, insect damage, and any other condition that prevents accurate inspection or creates doubt as to the identity of the variety or the control of pollination in the crop.

**Table 1 — Field standards for seed crops of open-pollinated varieties of sorghum**

S.No	Variable	Pre-basic seed	Basic seed	Certified seed
i	Previous cropping (seasons before), min.	1	1	1
ii	Isolation* m, min.	400	400	200
iii	Off types, %, max.	1/30	1/30	1/10
iv	Maximum number of plants infected with sorghum smut <i>Sphacelotheca cruenta</i> per 1 000 plants	1	1	2
v	Maximum number of plants infected with sorghum downy mildew per 1 000 plants	1	1	2
<p>* In all cases these isolation distances also apply to other sorghum species, such as <i>S. sudanense</i> and forage sorghum varieties that can cross-pollinate with <i>S. bicolor</i>.</p> <p>NOTE Isolation by time may be possible if minimum time enough to separate the flowering phase of two varieties or grade of a crop species is observed.</p>				

**Table 2 — Field standards for seed crops of hybrid sorghum**

S.No	Variable	Pre-basic seed	Basic seed	Certified seed
i	Previous cropping (seasons before), min.	1	1	1
ii	Isolation*, m, min.	400	400	200
iii	Off-types, per m <sup>2</sup> , max.	1/30	1/30	1/10
iv	Maximum number of plants infected with sorghum smut <i>Sphacelotheca cruenta</i>	1/1 000 plants	1/1 000 plants	2/1 000 plants
v	Maximum number of plants infected with sorghum downy mildew	1/1 000 plants	1/1 000 plants	2/1 000 plants

\* In all cases these isolation distances also apply to other sorghum species, such as *S. sudanense* and forage sorghum varieties that can cross-pollinate with *S. bicolor*.

NOTE Isolation by time may be possible if minimum time enough to separate the flowering phase of two varieties or grade of a crop species is observed.

## 8 Field inspection

**8.1** The national seed certification authority shall prepare the inspections' schedule for the inspectors, based on all necessary information on the field, to ensure that the timing of inspections allows the standards in Table 1 or Table 2 to be properly assessed.

**8.2** The inspector shall inspect the field in accordance with *OECD Seed Schemes: Guidelines for Control Plot Tests and Field Inspection of Seed Crops* and shall check for isolation requirements, off-types, the presence of noxious weeds and diseases.

**8.3** A minimum of three inspections shall be done for each seed production field to confirm if the field standards specified in Table 1 or Table 2 are met.

**8.4** At the time of the first inspection, the inspector shall confirm with the grower, the previous cropping of the field, checking on isolation, and the proof of origin/authentication of the variety planted by using the labels.

**8.5** For fields producing certified seed of hybrid varieties, the first inspection shall be conducted before flowering to check for isolation and rogueing; at this time the inspector shall also check the identity of the parental materials following the descriptors. The second and third inspections shall be done at the beginning and at the end of the flowering period respectively, to check rogueing and for male sterility in the female parent.

**8.6** Depending on the degree of contamination, the inspector may give instructions for off-types and diseased plants to be rogued so as to maintain the genetic purity.

In crops producing hybrid seed, rogueing is accepted as an option for ensuring varietal purity but plants shall be removed before pollen shedding begins. In the case of hybrids produced by male sterility, the inspector shall confirm that there are no male fertile plants in the female rows.

In case of noxious weeds found in the field, the grower shall be instructed to remove the weeds before harvesting.

**8.7** The field inspection report shall indicate the field status and comments for any corrective actions required such as re-inspection to confirm the field standards. All field inspection reports shall be provided to the grower and the seed enterprise after each inspection in a timely manner. The field inspection report in Annex B shall be signed by both the inspector and the grower or the grower's representative.

**8.8** At final inspection, seed from approved fields shall be securely packed in containers, and having been cleared, shall be identifiable by grower number, field crop number, packing unit, variety name and status, prior to leaving the field.

## 9 Seed sampling and laboratory standards

**9.1** The harvested seed from the field approved for certification shall be kept as an identified unit until processing. After processing, a sample shall be submitted to laboratory for testing where a conformed sample shall be given a certificate with a unique lot number for the purpose of tracking and sampling.

**9.2** The maximum size of a seed lot for certification purposes is 30 000 kg; lots larger than this shall be divided and given separate lot numbers.

**9.3** An inspector shall draw a representative composite sample from each lot according to the ISTA rules (Chapter 2).

**9.4** The composite sample shall be divided into three sub-samples, one for testing in the laboratory, one to be stored for reference purposes in case re-testing is necessary, and one for the post-control test. The samples shall be labelled, securely sealed and shall be stored in cool and dry conditions to prevent contamination and loss of germination.

**9.5** Laboratories authorized by the national seed certification authority to conduct seed testing for certification shall follow the methodology established in the ISTA rules for sorghum seed.

**9.6** The seed lots shall comply with the laboratory standards specified in Table 3 or Table 4.

**9.7** The seed laboratory test report shall be issued in accordance with Annex C.

**Table 3 — Laboratory standards for seeds lots of OPV sorghum varieties**

S. No	Variable	Pre-basic seed	Basic seed	Certified seed
i	Pure seed, %, min.	98	98	98
ii	Inert matter, % by weight, max.	1.95	1.95	1.95
iii	Other crop seeds, %, max.	0.05	0.05	0.05
iv	Germination, %, min.	80	80	80
v	Moisture content, %, max.	11	11	11
vi	Weed seeds, per kg, max.	0	0	0
NOTE Moisture content is expressed as a percentage of the weight of the original sample.				

**Table 4 — Laboratory standards for seeds lots of hybrid sorghum**

S. No	Variable	Pre-basic seed	Basic seed	Certified seed
i	Pure seed, %, min.	98	98	98
ii	Inert matter, % by weight, max.	2.0	2.0	2.0
iii	Other crop seeds, %, max.	0.01	0.01	0.08
iv	Germination, %, min.	80	80	80
v	Moisture content, %, max.	11	11	11
vi	Weed seeds, per kg, max.	0	0	0
NOTE Moisture content is expressed as a percentage of the weight of the original sample.				

## 10 Certificates

**10.1** The seed test certificate for a seed lot shall be signed and issued by the national seed certification authority and shall include all the information specified in Annex D. This certificate shall be valid for a period not exceeding twelve months.

**10.2** Carryover seed shall be re-sampled and retested for germination. If the test result complies with the minimum standards, a new test certificate shall be issued for the seed lot, which cancels the previously issued certificate, and shall include the certificate number of the cancelled certificate.

## 11 Packaging and labelling

**11.1** All classes of seed that have been certified shall be packaged in new containers which shall be marked with the company name and crop species and shall have the official label of the national seed certification authority.

**11.2** The labels for each class are identified by the following colours:

- Pre-basic seed: violet band on white
- Basic seed: white
- Certified seed 1<sup>st</sup> generation: blue
- Certified seed 2<sup>nd</sup> generation: red

**11.3** If seeds are treated with any chemical or product harmful for human or animal consumption, the container shall carry a label stating the chemical or product used and warning of the health risks.

**11.4.** The labels shall be prominent, indelible, legible and fixed to the containers by an authorized person in such a way that they cannot be destroyed or easily removed. The language on the label shall be English and any other additional language may be used. The following information shall be included on the official labels:

a) front of label:

- name of the crop, "Sorghum seed";
- species (Latin name);
- variety denomination;
- seed lot number;
- seed test certificate number;
- date of test;
- date of sealing;
- net weight; and
- seed treatment declaration (if applicable);

b) back of label:

- logo of the national seed certification authority;



- name and address of national seed certification authority;
- seed class;
- year of production;
- country of production; and
- statement of re-packing and re-labelling (if applicable).

**11.5** All containers shall be closed either by hand or machine stitching and shall be sealed in such a way that if they are opened illegally, that violation can be detected.

**11.6** Repackaging and relabeling are authorized in the following cases:

- a) the national seed certification authority may authorize the re-packaging and re-labelling of a particular seed lot that is produced in another country, but shall retain the original label information of the producing country; and
- b) blending of a seed lot with other lots of the same variety and class (generation) is allowable if all seed lots of the blend have met the field and laboratory requirements for certification prior to blending. A new lot number shall be issued. Details of the blended lots and their proportions shall be kept by the certifying authority for traceability.

## **12 Post-control tests**

The post-control tests shall be carried out in accordance with *OECD Schemes for Varietal Certification or the Control of Seed Moving in International Trade*.

## Annex A (normative)

### Characteristics for assessing varietal identity and purity when carrying out inspection of a sorghum seed crop

Stage of examination	Character number <sup>1)</sup>	Character description
<b>PRIMARY</b>		
Anthesis	7*	Tassel: time of anthesis
	8*	Tassel: time of anthesis
	9*	Tassel: anthocyanin coloration of glumes excluding base
	10*	Tassel: anthocyanin color of anthers
	14	Tassel: number of primary lateral branches
	15*	Ear: time of silk emergence
	16	Ear: anthocyanin coloration of glumes of cob
	17	Ear: intensity of anthocyanin coloration of silks
Medium milk	22.1*	Inbred lines only: Plant: length
	22.2*	Hybrids and open pollinated varieties only: Plant:
Ripening	26*	Ear: length
	30*	Ear: type of grain
	31	Ear: color of top of grain
	32	Ear: color of dorsal side of grain
	33	Ear: anthocyanin coloration of glumes of cob
	34	Ear: intensity of anthocyanin coloration of glumes of cob
<b>SECONDARY</b>		
Anthesis	3*	Leaf: angle between blade and stem
	4*	Leaf: attitude of blade
	6	Stem: anthocyanin coloration of brace roots
	11*	Tassel: density of spikelets
	12*	Tassel: angle between main axis and lateral branches
	13*	Tassel: attitude of lateral branches
	18*	Leaf: anthocyanin coloration of sheath
Ripening	20	Tassel: length of main axis above upper side branch
	28	Ear: shape
	29	Ear: number of rows of grain
<p>1) Please refer to the <i>UPOV Guidelines for the Conduct of Tests for Distinctness, Uniformity and Stability</i> Doc No. TG/2/6 +Corr. (24.11.1999) for explanation and method of examination</p> <p>NOTE Where the OECD character description differs from the UPOV character, it is indicated by * against the relevant character number.</p>		

## Annex B (normative)

### Field inspection report

Reference number .....

Date of the report .....

#### **Applicant**

Name .....

Address.....

Telephone: .....

E-mail.....

Registration number.....

#### **Contract grower**

Name .....

Address .....

Telephone:.....

E-mail:.....

#### **Field location**

Province/Region.....

District.....

Sector/Ward/Village .....

GPS coordinates.....

Field number.....

Field inspection number.....

Field size (Ha/acre) .....

Cropping year/Season .....

Crop species .....

Seed class .....

Variety denomination.....

Previous cropping.....

Variable	Inspection number	Observations/results	Comments/remarks
Isolation, m			
Off-types			
Noxious weeds			
Insect pests and diseases			
Other crops			
Others (specify)			
General conditions of crop (for example, drought, crop husbandry, etc.)			

**Comments/Remarks on performance and management of the crop**

.....  
.....  
.....  
.....  
.....

**Observations**

The field is/is not meeting field requirements.

**Reasons:**

.....  
.....  
.....  
.....  
.....

**Recommendations**

.....  
.....  
.....  
.....  
.....

Applicant signature & date .....

Contract seed grower signature & date .....

Name of authorized Inspector .....

Authorized Inspector ID card number .....

Signature & date .....

National seed certification authority .....

Signature & date.....

## Annex C (normative)

### Seed laboratory test report

Name of applicant:										
Species, variety, class, weight of lot:										
Testing and Issuing laboratory:										
Sampled by:										
Test number:										
Country of origin:										
Label serial number:										
Seed Lot Reference Number:										
Number of containers			Date of sampling		Date sample received		Date test(s) concluded		Test number	
<b>ANALYSIS RESULTS</b>										
Species										
Purity				Germination						Moisture content, %
Pure Seed %	Inert Matter, %	Other crop seeds %	Weed seeds, per kg	Number of days	Normal seedlings, %	Hard seeds, %	Fresh seeds, %	Abnormal seedlings, %	Dead seeds, %	
<b>REMARKS</b> Kind of inert matter:  Other crop seeds:  Weed seed:  Other determinations:										
Place				Date				Signature		

**Annex D**  
(normative)

**Seed test certificate**

This certificate is issued for a seed lot which has satisfied all the requirements of the certification scheme.

<b>Certificate No. ....</b>										
<b>APPLICANT INFORMATION</b>										
Name:										
Address:										
Country of origin (if applicable):										
<b>SEED LOT INFORMATION</b>										
Seed Lot Reference Number			Species and variety		Class		Weight of lot		Number of containers	
<b>SAMPLING AND TESTING INFORMATION</b>										
Date of sampling		Sampled by			Date sample received			Date test(s) concluded		
Name of testing laboratory:										
Test number:										
<b>ANALYSIS RESULTS</b>										
Purity,				Germination, %					Moisture content, %	
Pure Seed %	Inert Matter %	Other crop seeds %	Weed seeds Per kg	Normal seedlings	Abnormal seedlings	Fresh seeds	Hard seeds	Dead seeds		
<b>REMARKS</b>										
Kind of inert matter:										
Kind of other crop seeds:										
Kind of weed seeds:										
Other determinations:										

Previously issued certificate number (if applicable): .....

Statement of packaging and re-labelling: (if applicable): .....

The seed lot described above is hereby accepted as per KS/US/TZS/RS/NB EAS 821.

National Seed Certification Authority

Signature .....

Place and Date .....

## Bibliography

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