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Maize 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.

The Community has established an East African Standards Committee (EASC) mandated to develop and issue East African Standards (EAS). The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the public and private sector organizations in the community.

East African Standards are developed through Technical Committees that are representative of key stakeholders including government, academia, consumer groups, private sector and other interested parties. 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 Principles and procedures for development of East African Standards.

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.

The committee responsible for this document is Technical Committee EASC/TC 012, *Seeds and propagation material*.

Attention is drawn to the possibility that some of the elements of this document may be subject of patent rights. EAC shall not be held responsible for identifying any or all such patent rights.

This second edition cancels and replaces the first edition (EAS 821:2015), which has been technically revised.

Maize seed — Requirements for certification

1 Scope

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

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 (ISTA) 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 maize

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1 seed test certificate

legal document issued by the national seed certification authority, which states that a seed lot has met the prescribed 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
examination of a field and or seed crop, by an inspector to confirm that the minimum requirements for seed certification have been met

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 the 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 maize 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
Seed sampler
person authorized by the national designated seed certification authority to do seed sampling

3.13
label
tag or other device that is attached to, 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 relevant laws and regulations

3.14
previous cropping
minimum period (seasons or years) that must elapse between the production of a crop of the same 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 ensures that the variety remains true to type throughout its full life-span

3.16

national seed certification authority

designated authority responsible for conducting seed certification processes in the country

3.17

noxious weed

weed species, the seed of which is difficult to separate during processing or has undesirable effects on the crop produced

3.18

off-type

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

3.19

other seeds

seeds of any plant species other than that of the crop sample that is being tested

3.20

open pollinated variety (OPV)

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

3.21

parental lines

population or lines used by a breeder to develop and maintain a variety

3.22

post-control plot

small plot where a representative sample of a seed lot is grown to determine the identity and purity of the variety

3.23

pure seed

specie 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

3.24

variety registration

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

3.25

rogueing

removal of off-types, other varieties, and diseased or any other unwanted plants from a seed crop

3.26

seed certification

process by which the quality and identity of a seed lot is assured through official control by designated seed certification authority

3.27

seed lot

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

3.28

stability

state of a variety where distinguishing characteristics remain unchanged after repeated growing cycles

3.29

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

3.30

variety catalogue

detailed list of varieties that have been registered by a national designated authority

3.31

uniformity

state of a variety subject to the variation that may be expected from the particular features of its propagation, to remain sufficiently homogeneous in its relevant characteristics

3.32

synthetic variety

variety which is produced by crossing in all combination a number of inbred lines that combines well with each other. Once synthesized is maintained by open pollination in isolation

3.33

carryover seed

seed produced in previous season and stored for one or more cropping seasons/ or past its valid test duration subject to meeting the requirements of the standard upon retesting

3.34

pre-basic seed

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

Note 1 to entry breeder seed is an original parental material produced by the breeder and which is multiplied through one or more generations to produce pre-basic seed

3.35

basic seed

seed that has been produced from pre-basic seed that 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 (C1)

first generation of seed derived from basic seed

3.36.2

certified seed, 2nd generation (C2)

certified seed 1st generation which is multiplied once

4 Symbols and/or 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 variety descriptors, genetic purity of seed sown, field standards, laboratory standards and 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 the EAC and are included in the national variety 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 certification shall be undertaken in accordance with UPOV and OECD Seed scheme. 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 the EAC on request.

5.2 Inspection and laboratory testing

5.2.1 Application for inspection

A grower shall apply for inspection of a seed crop within thirty (30) days after planting by filling the form with the information as prescribed in Annex A. The minimum information for an application for inspection 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 as guided by the 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.

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:
 - i. 1st generation (C1); and
 - ii. 2nd generation.(C2)

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.

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

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

7.6 Fields may be rejected for certification because of unsatisfactory conditions caused by noxious weeds, poor growth, poor crop stands, incidence and severity of disease of importance, 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 requirement standards for seed crops of open-pollinated varieties of maize.

S/N	Variable	Pre-basic seed	Basic seed	Certified seed	
i.	Previous cropping (seasons before) ¹⁾ , min.	1	1	1	
ii.	Isolation, m, min.	400	400	200	
iii.	Off-types, %, max.	0.1	0.1	1 st generation (C1)	0.5
				2 nd generation (C2)	1
iv.	Maximum number of plants infected with head smut (<i>Sphacelotheca reiliana</i>) - at final inspection	0	0	0	

S/N	Variable	Pre-basic seed	Basic seed	Certified seed
v.	Maximum number of plants infected with common smut (<i>Ustilago zaeae</i>) – at final inspection	0	0	0
vi.	Maximum number of plants infected with loose smut (<i>Ustilago maydis</i>) – at final inspection	0	0	0
vii.	Maximum number of plants infected with Maize chlorotic mottle virus disease) – at final inspection	0	0	0
viii.	Maximum number of plants infected with Maize lethal necrotic disease) – at final inspection	0	0	0
ix.	Number of noxious weeds, max	0	0	0
x.	Number of inspections, min	2	2	2

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

1 If the field has been infested with smut then, the previous cropping shall be two seasons.

Table 2 — Field requirement standards for seed crops of hybrid maize

S/N	Variable	Pre-basic seed	Basic seed	Certified seed
i	Previous cropping (seasons before) ^{a)} , min.	1	1	1
ii	Isolation, m, min.	400	400	200
iii	Off-type, %, max	Female	0.1	1
		Male	0.1	0.2
iv	Maximum number of female plants that have shed or are shedding pollen, %	From a single inspection	0.5	1
		From all inspections	1	2
v	Minimum number of Inspections	3	3	3
vi	Maximum number of plants infected with head smut (<i>Sphacelotheca reiliana</i>) - at final inspection	0	0	0
vii	Maximum number of plants infected with common smut (<i>Ustilago zaeae</i>) – at final inspection	0	0	0
viii	Maximum number of plants	0	0	0

S/N	Variable	Pre-basic seed	Basic seed	Certified seed
	infected with loose smut (<i>Ustilago maydis</i>) – at final inspection			
ix	Maximum number of plants Infected with Maize lethal necrotic disease at final inspection— at final inspection	0	0	0
x	Maximum number of plants Infected with Maize chlorotic mottle virus disease— at final inspection	0	0	0
<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> <p>a If the field has been infested with smut then, the previous cropping shall be two seasons.</p>				

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 Inspections shall be done for each seed production field to confirm the field standards specified in Table 1 or Table 2.

8.4 In crops producing hybrid varieties, the first inspection shall be done when 1 % of the females are at the silking stage. The second inspection shall be done five to seven days thereafter while the third shall be done when most silks are dry (non-receptive) and where necessary the pre- harvest inspection may be done after separation of the male rows from the seed.

8.5 In a crop producing hybrid seed, the inspector shall check the identity of the parental lines following the official descriptors.

8.6 For open pollinated varieties (OPV), a minimum of two field inspections shall be done shortly before pollen sheds and before harvest.

8.7 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/authenticity of the variety planted by using the labels.

8.8 Depending on the degree of contamination, the inspector may give instructions for off-types and diseased plants to be rogued to maintain the genetic purity. In crops producing hybrid seed, roguing 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.

8.9 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 the inspector and may be signed by the grower or the grower's representative.

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. The identification shall include; grower's number, field crop number, packing unit, variety name and seed class. After processing, a sample shall be submitted to the laboratory for testing where a conformed sample shall be given a certificate with a unique lot number for the purpose of traceability.

9.2 The maximum size of a seed lot for certification purposes is 40 000 kg; lots larger than this shall be divided and given separate lot numbers.

9.3 An official seed sampler shall draw a representative composite sample from each lot as guided by ISTA Rules

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 maize seed

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

Table 3 — Laboratory standards for seed lots of open-pollinated varieties of maize

S/N	Variable	Pre-basic seed	Basic seed	Certified seed
i	Pure seed, %, min.	99	99	99
ii	Inert matter, max.	0.95	0.95	0.95
iii	Other crop seeds, %, max.	0.05	0.05	0.05
iv	Germination, %, min.	90	90	90
v	Moisture content, %, max.	13	13	13
vi	Number of weed seeds, per kg, max.	0	0	0
NOTE Moisture content is expressed as a percentage of the fresh weight of the original sample.				

Table 4 — Laboratory standards for seed lots of hybrid varieties of maize

S/N	Variable	Pre-basic seed	Basic seed	Certified seed
i.	Pure seed, %, min.	99	99	99
ii.	Inert matter, max.	0.95	0.95	0.95
iii. i	Other crop seeds, %, max.	0.05	0.05	0.05
iv. v	Germination, %, min.	90	90	90
v.	Moisture content, %, max.	13	13	13
vi.	Number of 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 C. 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, 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:

- a) pre-basic seed: violet band on white;
- b) basic seed: white;
- c) certified seed 1st generation (C1): blue; and
- d) certified seed 2nd generation (C2): 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 official language of the member state may be used. The following information shall be included on the official labels provided by national seed certification authority:

- a) name of the crop, as, "Maize seed";
- b) species (Latin name);
- c) variety denomination;
- d) seed lot number;
- e) seed test certificate number;
- f) date of test;
- g) net weight;
- h) seed treatment declaration (if applicable);
- i) logo of the national seed certification authority;
- j) name and address of national seed certification authority;
- k) seed class; and
- l) germination rate and purity level

11.5 The following information shall be given in the container in addition to the official labels provided by national seed certification authority;

- a) net weight;
- b) country of production;
- c) year of production;
- d) seed treatment declaration;
- e) name and address of the grower;
- f) seed class; and
- g) lot number

11.6 Repackaging and relabelling 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)

Application for field inspection of a seed crop

FORM No..... Grower No.....

APPLICATION FOR FIELD INSPECTION OF A SEED CROP

1. Full name of grower _____ Postal Address _____ Tel. No. _____
2. Farm on which the seed crop is being grown _____ L/R. No. _____
3. Physical location _____ GPS coordinates _____
4. Details of crop (Every crop regardless of size must be mentioned separately. A crop is field planted within 5 days).

Crop

Field crop No.	Species	Variety	Lot No. of seeds used	Class of seed used	Ha	Date planted	Approximate date of harvest	Previous cropping history(Last 3 seasons)		

4. Seed rate per hectare _____ kg
5. Registered seed merchant to whom the entire seed stock will be sold _____
6. I have enclosed _____ number of labels from packets /containers of the Seed for this crop(s); as proof of origin.
7. The person who will daily be in charge of his seed crop is(Name/Telephone number) _____

8. Declaration:

I hereby declare that all information provided here is true to the best of my knowledge and belief and I shall always observe all conditions governing Seeds production as provided in the Seeds Act and Regulations

Date.....Signature of Applicant

Stamp of seed Merchant/Grower.....

Annex C (Normative)

Seed testing certificate

Form SR.....

OFFICIAL SEED TESTING CERTIFICATE

Date of Sampling													
Date received													
Lot Number						Ref		Weight of lot:					
Crop species, Variety		As stated by inspector:											
Country of Origin													
RESULTS OF ANALYSIS													
Purity			Germination								Moisture		Test No.
Pure seed (P) %	Inert matter %	Other Crop seed %	First count Days	Ger m (G) %	(Fina l count) Days	Germ (G) %	Har d %	Fresh Unger m %	Dea d %	Pure germinat ing seed PxG (%) 100	Moistur e %	Any inquiries concerning this test MUST quote this	
Abnormal %		Broken %		Germ s									
(1)													
(2)													
(3)													
Special Tests Seed dressing:								Official seed Tester					
								Date: _____					
Copies To								Seed Testing Laboratory					

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