EAST AFRICAN STANDARD

Maize grains — Specification

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.

EAS 2:2013 was prepared by Technical Committee EAS/TC 014, Cereals, Pulses and related products

This third edition cancels and replaces the second edition (EAS 2:2005) which has been technically revised.
Introduction

This standard has been developed to take into account:

a) the needs of the market for the product;

b) the need to facilitate fair domestic, regional and international trade and prevent technical barriers to trade by establishing a common trading language for buyers and sellers;

c) the structure of the CODEX, UNECE, USA, ISO and other internationally significant standards;

d) the needs of the producers in gaining knowledge of market standards, conformity assessment, commercial cultivars and crop production process;

e) the need to transport the product in a manner that ensures keeping of quality until it reaches the consumer;

f) the need for the plant protection authority to certify, through a simplified form, that the product is fit for cross-border and international trade without carrying plant disease vectors;

g) the need to promote good agricultural practices that will enhance wider market access, involvement of small-scale traders and hence making farming a viable means of wealth creation; and

h) the need to ensure a reliable production base of consistent and safe crops that meet customer requirements.
Maize grains — Specification

1 Scope

This East African Standard specifies the requirements and methods of sampling and test for maize grains of varieties grown from common maize grains, Zea Mays indentata L., and/or Zea mays indurata L., or their hybrids intended for human consumption.

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.

EAS 38, Labelling of pre-packaged foods — Specification

EAS 39, Hygiene in the food and drink manufacturing industry — Code of practice

EAS 79, Cereals, pulses and milled products — Sampling of static batches

EAS 217, Methods for the microbiological examination of foods

EAS 285, Maize-Determination of moisture content

ISO 605, Pulses — Determination of impurities, size, foreign odours, insects, and species and variety — Test methods

ISO 711, Cereals and cereal products — Determination of moisture content (Basic reference method)

ISO 712, Cereals and cereal products — Determination of moisture content — Routine reference method

ISO 5223, Test sieves for cereals

ISO 13690, Cereals, pulses and milled products — Sampling of static batches

ISO 16050, Foodstuffs — Determination of aflatoxin B₁, and the total content of aflatoxin B₁, B₂, G₁ and G₂ in cereals, nuts and derived products — High performance liquid chromatographic method

CODEX STAN 193, Codex general standard for contaminants and toxins in food and feed

3 Terms and definitions

For the purposes of this standard, the following terms and definitions shall apply.

3.1 maize (corn)

shelled grains or kernels of the species Zea mays indentata L, (dent maize) and/or Zea mays indurata L, (flint maize), or their hybrids
3.2 blemished/damaged
grains which are insect or vermin damaged, stained, diseased, discoloured, germinated, frost damaged, or otherwise materially damaged

3.3 insect or vermin damaged
kernels with obvious weevil-bored holes or which have evidence of boring or tunneling, indicating the presence of insects, insect webbing or insect refuse, or degermed grains, chewed in one or more than one part of the kernel which exhibit evident traces of an attack by vermin

3.4 stained
kernels whose natural colour has been altered by external factors. This includes ground, soil or weather damaged kernels, which may have dark stains or discolourations with a rough external appearance

3.5 diseased
grains made unsafe for human consumption due to decay, moulding, or bacterial decomposition, or other causes that may be noticed without having to cut the grains to examine them

3.6 discoloured
kernels materially discoloured by excessive heat, including that caused by excessive respiration (heat damage) and dried damaged kernels. Kernels may appear darkened, wrinkled, blistered, puffed or swollen, often with discoloured, damaged germs. The seed coat may be peeling or may have peeled off completely, giving kernels a checked appearance

3.7 germinated
kernels showing visible signs of sprouting, such as cracked seed coats through which a sprout has emerged or is just beginning to merge

3.8 frost damaged
kernels which appear bleached or blistered and the seed coat may be peeling, germs may appear dead or discoloured

3.9 mouldy
grains with visible mycelial growth on its tip or surface

3.10 immature/shriveled
grains which are underdeveloped, thin and papery in appearance

3.11 broken kernels
pieces of maize which shall pass through a 4.50 mm metal sieve

3.12 other grains
edible grains, whole or identifiable broken, other than maize (i.e., cereals, pulses and other edible legumes)

3.13 foreign matter
all organic and inorganic material (such as sand, soil, glass) other than maize, broken kernels and other grains
3.14
filth
impurities of animal origin

3.15
defective
pest damaged, discouloured, diseased, germinated, mouldy, immature and shrivelled grains, or otherwise materially damaged, which specifically do not include broken grains

3.16
food grade material
packaging material, made of substances which are safe and suitable for their intended use and which will not impart any toxic substance or undesirable odour or flavour to the product

4 Quality requirements

4.1 General requirements

4.1.1 Maize may be presented as yellow, white, or red, or a mixture of these colours.

4.1.2 Yellow maize may contain not more than 5.0 % by weight of maize of other colours. Maize grains which are yellow and/or light red in colour are considered to be yellow maize. Yellow maize also means maize grains which are yellow and dark red in colour, provided the dark red colour covers less than 50 % of the surface of the grain.

4.1.3 White maize may contain not more than 2.0 % by weight of maize of other colours. Maize grains which are white and/or light pink in colour are considered to be white maize. White maize also means maize grains which are white and pink in colour, provided the pink colour covers less than 50 % of the surface of the grain.

4.1.4 Red maize may contain not more than 5.0 % by weight of maize of other colours. Maize grains which are pink and white, grey or dark red and yellow in colour are considered to be red maize, provided the pink or dark red or yellow colour covers 50 % or more of the surface of the grain.

4.1.5 Mixed maize includes maize not falling into the classes of white, yellow or red maize as defined in 4.1.2 to 4.1.4

4.1.6 Maize may be presented as flint or dent or their hybrids or mixtures thereof.

4.1.7 Flint maize includes maize of any colour which consists of 95 % or more by weight of grains of flint maize.

4.1.8 Dent maize includes maize of any colour which consists of 95 % or more by weight of grains of dent maize.

4.1.9 Flint and dent maize includes maize of any colour which consists of more than 0.5 % but less than 95.0 % of flint maize.

4.1.10 Maize shall be free from foreign odours, moulds, live pests, rat droppings, toxic or noxious weed seeds and other injurious contaminants as determined from samples representative of the lot.

4.1.11 Maize shall be of a reasonably uniform colour according to type, be whole and clean.

4.2 Specific requirements

Maize grains shall be categorised into three grades on the basis of the tolerable limits established in Table 1.
Table 1 — Specific requirements

<table>
<thead>
<tr>
<th>S/N</th>
<th>Characteristics</th>
<th>Maximum limits</th>
<th>Method of test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Grade 1</td>
<td>Grade 2</td>
</tr>
<tr>
<td>i)</td>
<td>Foreign matter, % m/m</td>
<td>0.5</td>
<td>1.0</td>
</tr>
<tr>
<td>ii)</td>
<td>Inorganic matter, % m/m</td>
<td>0.25</td>
<td>0.5</td>
</tr>
<tr>
<td>iii)</td>
<td>Broken kernels, % m/m</td>
<td>2.0</td>
<td>4.0</td>
</tr>
<tr>
<td>iv)</td>
<td>Pest damaged grains, % m/m</td>
<td>1.0</td>
<td>3.0</td>
</tr>
<tr>
<td>v)</td>
<td>Rotten and diseased grains, % m/m</td>
<td>2.0</td>
<td>4.0</td>
</tr>
<tr>
<td>vi)</td>
<td>Discoloured grains, % m/m</td>
<td>0.5</td>
<td>1.0</td>
</tr>
<tr>
<td>vii)</td>
<td>Moisture, % m/m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>viii)</td>
<td>Immature/shrivelled grains, % m/m</td>
<td>1.0</td>
<td>2.0</td>
</tr>
<tr>
<td>ix)</td>
<td>Filth, % m/m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>x)</td>
<td>Total defective grains, % m/m</td>
<td>3.2</td>
<td>7.0</td>
</tr>
<tr>
<td>xi)</td>
<td>Total aflatoxin (AFB$_1$+AFB$_2$+AFG$_1$+AFG$_2$), ppb</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>xii)</td>
<td>Aflatoxin B$_1$, ppb</td>
<td></td>
<td></td>
</tr>
<tr>
<td>xiii)</td>
<td>Fumonisin, ppm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE  The parameter, Total defective grains is not the sum total of the individual defects. It is limited to 70 % of the sum total of individual defects.

5 Contaminants

5.1 Pesticide residues

Maize grains shall comply with those maximum pesticide residue limits established by the Codex Alimentarius Commission for this commodity

NOTE  Where the use of certain pesticides is prohibited by some Partner States, it should be notified to all Partner States accordingly.

5.2 Other contaminants

Maize grains shall comply with those maximum limits for other contaminants established in CODEX STAN 193.

6 Hygiene

6.1 Maize grains shall be produced, prepared and handled in accordance with the provisions of appropriate sections of EAS 39.

6.2 When tested by appropriate standards of sampling and examination listed in Clause 2, the products shall:

a) be free from microorganisms in amounts which may represent a hazard to health and shall not exceed the limits stipulated in Table 2;

b) be free from parasites which may represent a hazard to health; and
c) not contain any substance originating from microorganisms in amounts which may represent a hazard to health.

<table>
<thead>
<tr>
<th>S/N</th>
<th>Type of micro-organisms</th>
<th>Limits</th>
<th>Method of test</th>
</tr>
</thead>
<tbody>
<tr>
<td>i)</td>
<td>Yeasts and moulds, cfu per g, max.</td>
<td>$10^4$</td>
<td></td>
</tr>
<tr>
<td>ii)</td>
<td><em>Staphylococcus aureus</em>, cfu per g, max.</td>
<td>$10^3$</td>
<td>EAS 217</td>
</tr>
<tr>
<td>iii)</td>
<td><em>Escherichia coli</em> per g</td>
<td>Absent</td>
<td></td>
</tr>
<tr>
<td>iv)</td>
<td><em>Salmonella</em> per 25 g</td>
<td>Absent</td>
<td></td>
</tr>
</tbody>
</table>

### 7 Packaging

7.1 Maize grains shall be packed in suitable packages which shall be clean, sound, free from insect, fungal infestation and the packaging material shall be food grade.

7.2 Maize grains shall be packed in containers which will safeguard the hygienic, nutritional, and organoleptic qualities of the products.

7.3 Each package shall contain maize grains of the same type and of the same grade designation.

7.4 If maize grains are presented in bags, the bags shall also be free of pests and contaminants.

7.5 Each package shall be securely closed and sealed.

### 8 Labelling

In addition to the requirements in EAS 38, each package shall be legibly and indelibly labelled with the following:

i) product name as “White Maize Grains, Yellow Maize Grains Red Maize Grains or Mixed Maize Grains”;

ii) grade;

iii) name, address and physical location of the producer/packer/importer;

iv) lot/batch/code number;

v) net weight, in kilograms;

NOTE EAC Partner States are signatory to the International Labour Organizations (ILO) for maximum package weight of 50 kg where human loading and offloading is involved.

vi) the declaration “Food for Human Consumption”;

vii) storage instruction as “Store in a cool dry place away from any contaminants”;

viii) crop year;

ix) packing date;

x) instructions on disposal of used package;

xi) country of origin; and
xii) a declaration on whether the maize was genetically modified where applicable.

9 Methods of sampling

Sampling shall be done in accordance with the EAS 79/ISO 13690.