

**ICS 67.060**

**DMS 32:2014**

Third Edition

**MALAWI STANDARD**

**Maize grain – Specification**

**NOTE: This is a draft proposal and it shall neither be used nor regarded as a Malawi Standard**

## Maize grain – Specification

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## FOREWORD

Maize is the staple food for Malawi. It may be presented in packaged form or sold loose from the package in a dry state to the consumer. Therefore, to ensure that maize supplied to consumers is safe, hygienic and of good quality, and at the same time to give guidance to packers and distributors to supply such a good quality product, a request was made for this standard to be made.

This Malawi standard is a revision of MBS 32:1998, and has been prepared with reference to the following standards:

Codex Stan 153:1985, *Codex standard for maize (corn)*, and

EAS 2:2011, *East African Standard, Maize grain – Specification* (Tables 1 and 2, and definitions).

Acknowledgement is made for the use of the information.

## TECHNICAL COMMITTEE

This Malawi Standard was prepared by the Technical Committee *MBS/TC 16, Primary agricultural products* and the following companies, organizations and institutions were represented:

- ADMARC Limited;
- Agricultural Commodity Exchange for Africa;
- Auction Holdings Commodity Exchange;
- Bakhresa Grain Milling Malawi Limited;
- Blantyre Agricultural Development Division;
- Bvumbwe Agricultural Research Station;
- Lilongwe University of Agriculture and Natural Resources (LUANAR) – Bunda Campus;
- Malawi Bureau of Standards;
- Malawi Investment and Trade Centre;
- National Smallholder Farmers' Association of Malawi (NASFAM);
- Rab Processors Limited; and
- Transglobe Produce Export Limited.

**NOTICE**

*This standard shall be reviewed every five years, or earlier when it is necessary, in order to keep abreast of progress. Comments are welcome and shall be considered when the standard is being reviewed.*

PUBLIC REVIEW DRAFT

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## MALAWI STANDARD

# Maize grain – Specification

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### 1 SCOPE

This Malawi Standard applies to maize (corn) for direct human consumption, i.e. ready for its intended use as human food, presented in packaged form or sold loose from the package direct to the consumer. The standard specifies requirements for whole grain shelled dent maize (*Zea mays indentata* L.) and/or shelled flint maize (*Zea mays indurata* L.).

### 2 NORMATIVE REFERENCES

The following standards contain provisions, which through reference in this text, constitute provisions of this Malawi standard. All standards are subject to revision and, since any reference to a standard is deemed to be a reference to the latest edition of that standard, parties to agreements based on this standard are encouraged to take steps to ensure the use of the most recent edition of the standard indicated below. Information on current valid national and international standards can be obtained from the Malawi Bureau of Standards.

MS 19: *Labeling of prepacked foods – General standard;*

MS 21: *Food and food processing units – Code of hygienic conditions;*

MS 146: *Cereals – Sampling (as grain);*

MS 302: *Contaminants and toxins in food – General standard;*

ISO 5223: *Test sieves for cereals;*

ISO 13690: *Cereals, pulses and milled products – Sampling of static batches.*

### 3 DESCRIPTION

#### 3.1 Product definition

Maize is the shelled grains of the species defined in the scope.

#### 3.2 Definition of defects

##### 3.2.1

##### **blemished (defective) grains**

grains which are insect or vermin damaged, stained, diseased, shrivelled (immature), broken, discoloured, germinated, frost damaged or otherwise materially damaged

##### 3.2.1.1

##### **broken grains**

pieces of grains or maize which will pass through a 4.5 mm round hole metal sieve according to ISO 5223

### **3.2.1.2**

#### **discoloured grains**

include those materially discoloured by excessive heat including that caused by excessive respiration (heat damage). Grains 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 grains a checked appearance

### **3.2.1.3**

#### **diseased grains**

rotting grains which can usually be detected without opening the grain for examination

### **3.2.1.4**

#### **frost damaged grains**

may appear bleached or blistered and the seed coat may be peeling. Germs may appear dead or discoloured

### **3.2.1.5**

#### **germinated grains**

grains showing visible signs of sprouting, such as cracked seed coats through which a sprout has emerged or is just beginning to emerge

### **3.2.1.6**

#### **insect or vermin damaged grains**

include those grains 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 grain which exhibit evident traces of an attack by vermin

### **3.2.1.7**

#### **shriveled (immature) grains**

grains which are shriveled over the entire surface and not just over the embryo area

### **3.2.1.8**

#### **stained grain**

those whose natural colour has been altered by external factors. This includes ground or weather damaged grains which may have dark stains or discolourations with a rough external appearance

## **3.2.2 filth, foreign matter and other grains**

### **3.2.2.1**

#### **filth**

impurities of animal origin, excluding dead or live insects

### **3.2.2.2**

#### **foreign matter**

all organic and inorganic material other than maize grains, broken grains, other grains and filth

#### **3.2.2.2.1**

##### **inorganic matter**

include sand, stones, pebbles, dirt, lumps of earth, clay, mud, glass and metallic pieces

#### **3.2.2.2.2**

##### **organic matter**

includes leaf or cob materials from the maize plant, other vegetable materials such as grass, wood or other cereals, weeds and dead insects

### **3.2.2.3**

#### **other grains**

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

## **3.3 Presentation**

**3.3.1** Maize may be presented as yellow, white or a mixture of these colours.

### **3.3.1.1 Yellow maize**

May contain not more than 5.0 % by mass 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 grains which are yellow and dark in colour, provided the dark red colour covers less than 5.0 % of the surface of the grain.

### **3.3.1.2 White maize**

May contain not more than 2.0% by mass 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 5.0% of the surface of the grain.

### **3.3.1.3 Mixed maize**

Includes maize not falling into classes of white or yellow maize as defined in **3.3.1.1** and **3.3.1.2**.

**3.3.2** Maize may also be presented as flint or dent or mixtures thereof.

#### **3.3.2.1 Flint maize**

Includes maize of any colour which consists of 95.0 % or more by mass of grains of flint maize.

#### **3.3.2.2 Dent maize**

Include maize of any colour which consists of 95.0 % or more by mass of dent maize.

#### **3.3.2.3 Flint-dent maize**

Include maize of any colour which consists of more than 5.0 % but less than 95.0 % by mass of flint maize.

## **4. ESSENTIAL COMPOSITION AND QUALITY FACTORS**

### **4.1 Quality factors – General**

**4.1.1** Maize shall be safe and suitable for human consumption.

**4.1.2** Maize shall be free from abnormal flavours, odours and living insects.

**4.1.3** Maize shall be free from filth in amounts which may represent a hazard to human health.

### **4.2 Quality factors – Specific**

#### **4.2.1 Moisture content**

The moisture content of maize grains shall not exceed 14.0 % m/m as determined from samples representative of the lot.

#### **4.2.2 Aflatoxin content**

Maize shall comply with the aflatoxin limits provided in **Table 1** below.

### **4.3 Tolerances for defects**

Based on a sample, the product shall comply with the requirements given in **Table 1** below:

**Table 1: Requirements for maize**

S/N	Characteristics	Maximum limits			Method of test
		Grade 1	Grade 2	Grade 3	
1	Foreign matter, % m/m	0.5	1.0	1.5	ISO 605
2	Inorganic matter, % m/m	0.25	0.5	0.75	
3	Broken kernels, % m/m	2.0	4.0	6.0	
4	Pest damaged grains, % m/m	1.0	3.0	5.0	
5	Rotten & Diseased grains, % m/m	2.0	4.0	5.0	
6	Discoloured grains, % m/m	0.5	1.0	1.5	
7	Moisture, % m/m	12.0	13.0	14.0	ISO 711/712
8	Immature/Shriveled grains, % m/m	1.0	2.0	3.0	ISO 605
9	Filth, % m/m	0.1	0.1	0.1	
10	Total Aflatoxins, ppb	15			ISO 16050
11	Aflatoxin B1, ppb	5			
12	Fumonisin, ppm	2			
13	Total Defectives Grains, % m/m	4.0	5.0	7.0	ISO 605

**Note** – The worst parameter will determine the grade.

#### 4.4 Toxic or noxious seeds

The products covered by the provisions of this standard shall be free from the following toxic or noxious seeds in amounts which may represent a hazard to human health:

4.4.1 *Crotalaria* (*Crotalaria* spp.), Corn cockle (*Agrostemma githago* L.), Castor bean (*Ricinus communis* L.), Jimson weed (*Datura* spp.), and other seeds are commonly recognized as harmful to health.

## 5. CONTAMINANTS

### 5.1 Heavy metals

Maize shall be free from heavy metals in amounts which may represent a hazard to human health, and shall comply with the requirements for this product prescribed in MS 302

### 5.2 Pesticide residues

Maize shall comply with those maximum pesticide residue limits as laid down by Codex Alimentarius Commission and adopted by the Malawi Bureau of Standards.

## 6 HYGIENE

6.1 The product covered by the provisions of this standard shall be prepared in accordance with the appropriate sections of MS 21.

6.2 to the extent possible in Good Manufacturing Practice, the product shall be free from objectionable matter, having regard to the tolerances indicated in Section 4.3 and table 1, where applicable.

6.3 When tested by appropriate methods of sampling and examination, the product:

6.3.1 Shall be free from microorganisms in amounts which may represent a hazard to health, and shall conform to the limits provided in table 2;

6.3.2 Shall be free from parasites which may represent a hazard to health; and



6.3.3 shall not contain any substances originating from microorganisms in amounts which may represent a hazard to health, .

**Table 2: Microbiological limits**

S/No.	Type of micro-organism	Limits
1	Yeasts and moulds, max. per g	10 <sup>4</sup>
2	<i>Staphylococcus aureus</i> per 25 g	Absent
3	<i>Escherichia coli</i> , max. per g	Absent
4	<i>Salmonella</i> , max. per 25 g	Absent

## 7. PACKAGING

7.1 The product shall be packed in grain bags strong enough for the conveyance of 50 kg.

7.2 Grain bags shall be made only of substances which are safe for their intended use, and shall not be so weathered or worn-out to avoid breakage during normal handling.

7.3 Grain bags shall be clean and not stained by any colouring substance or impregnated by any liquid capable of imparting stains, excluding trade marks or normal discolouring due to exposure to the sun.

## 8 LABELLING

In addition to the requirements of MS 19, the following specific provisions shall apply:

8.1 The name of food

8.1.1 The name of the food to be declared on the label shall be "maize".

8.1.2 In addition, maize may be designated with appropriate terms indicated in sections 3.3.1 and 3.3.2 provided it complies with the requirements defined in sections 3.3.1.1 to 3.3.1.3 and 3.3.2.1 to 3.3.2.3 respectively.

8.2 The net content shall be declared by weight in metric units.

8.3 The container (bag) shall be permanently marked in code of clear writing to identify the packer or distributor and the lot.

8.4 Place of origin of the maize shall be declared.

## 9 METHODS OF SAMPLING AND ANALYSIS

### 9.1 Sampling

Sampling for testing as required in this specification shall be done according to MS 146.

### 9.2 Methods of analysis

Analysis of maize shall be done in accordance with ISO 13690.

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**THE MALAWI BUREAU OF STANDARDS**

The Malawi Bureau of Standards is the standardizing body in Malawi under the aegis of the Ministry of Industry and Trade. Set up in 1972 by the Malawi Bureau of Standards Act (Cap: 51:02), the Bureau is a parastatal body whose activities aim at formulating and promoting the general adoption of standards relating to structures, commodities, materials, practices, operations and from time to time revise, alter and amend the same to incorporate advanced technology.

**CERTIFICATION MARK SCHEME**

To bring the advantages of standardization within the reach of the common consumer, the Bureau operates a Certification Mark Scheme. Under this scheme, manufacturers who produce goods that conform to national standards are granted permits to use the Bureau's "Mark of Quality" depicted below on their products. This Mark gives confidence to the consumer of the commodity's reliability.



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