

**MINISTRY OF AGRICULTURE, WATER
AND RURAL DEVELOPMENT**

No. 71

1994

**REGULATIONS RELATING TO GRADING AND
CLASSIFICATION OF MAIZE**

Under section 24(1) of the Agronomic Industry Act, 1992 (Act 20 of 1992) I hereby make the regulations set out in the Schedule.

**N. MBUMBA
MINISTER OF AGRICULTURE,
WATER AND RURAL
DEVELOPMENT**

Windhoek, 18 April 1994

SCHEDULE

Definitions

1. In these regulations, unless the context otherwise indicates -

“defective kernels” means -

(a) maize kernels or pieces of maize kernels -

(i) which are wizened, obviously immature, frost-damaged or mouldy or are discoloured (excluding normal browning by oxidation, discolouration limited to the connecting tip of the kernel or pinking);

(ii) which are sprouted, including kernels of which the growing point (plumule) in the germ is visibly discoloured;

(iii) with cavities in the germ or endosperm caused by insects or rodents;

(iv) which are visibly contaminated by smut, soil, smoke or coal dust;

(v) that pass through a screen with 6,35 mm round holes; or

(vi) which are otherwise clearly of inferior quality;

(b) maize kernels of cultivars other than *Zea mays indentata* or *Zea mays indurata*, such as bread maize (flour-corn), popcorn, sweet-corn and waxy maize;

“foreign matter” means any matter other than maize;

“kernels of another colour”, in relation to -

(a) white maize, means maize kernels of a colour other than white, excluding pinked kernels;

(b) yellow maize, means maize kernels of a colour other than yellow, excluding pinked kernels;

“pinked kernels” means maize kernels of which the endosperm is white or yellow and of which the pericarp or part thereof is of a red or pink colour;

“sample grade maize” means the threshed seed of the plant *Zea mays indentata* or *Zea mays indurata* not complying with the maximum deviations prescribed in regulation 4 or being weevily maize as contemplated in regulations 5;

“white maize” means maize of the white dent type botanically known as *Zea mays indentata* or of the white flint type botanically known as *Zea mays indurata* or of a mixture of the two types or of one or more crosses of the two types;

“yellow maize” means maize of the yellow dent type botanically known as *Zea mays indentata* or the yellow flint type botanically known as *Zea mays indurata* or of a mixture of the two types or of one or more crosses of the two types.

Classes of maize

2. For the purposes of these regulations maize shall be classified in the following classes, namely -

- (a) white maize;
- (b) yellow maize;
- (c) sample grade maize.

Grades for white maize and yellow maize

3. (1) The grades for the classes white maize and yellow maize referred to in regulation 2 shall be as follows:

<i>Class of maize</i>	<i>Grades</i>
(a) white maize	WM1, WM2 and WM3
(b) yellow maize	YM1, YM2 and YM3

(2) Subject to the allowable deviations prescribed in regulation 4, maize of any grade referred to in subregulation (1) shall be -

- (a) free from a musty, sour or other objectionable odour;
- (b) free from foreign matter;
- (c) of a standard suitable for the manufacture of maize products for human consumption;
- (d) free from defective kernels; and
- (e) free from kernels of another colour or pinked kernels.

Allowable deviations

4. The maximum deviation from the requirements prescribed in subregulation (2) of regulation 3 that may be allowed in respect of the different grades of maize referred to in subregulation (1) of that regulation, shall be as follows -

Description of deviation	Maximum percentage of deviation allowed (m/m)					
	White maize			Yellow maize		
	WM1	WM2	WM3	YM1	YM2	YM3
1. Defective kernels	7	13	25	—	—	—
2. Defective kernels above 6,35 mm grading-sieve	—	—	—	9	20	30
3. Defective kernels below 6,5 mm grading-sieve	—	—	—	4	10	30
4. Maize kernels of another colour	3	6	10	2	5	5
5. Foreign matter	0,3	0,5	0,75	0,3	0,5	0,75
6. Deviations in items (1), (2), (3), (4) and (5) collectively, provided such deviations are individually within the limits specified above	8	16	25	9	20	30
7. Pinked kernels	12	12	12	12	12	12

Weevily Maize

5. Where maize has become infested with live weevils or other live insects injurious to stored grain, irrespective of whether such insects are present in the maize or on the containers thereof, any designation of the relevant class or grade of such maize on such containers or otherwise, shall include the words "weevily maize".

Packing of maize

6. (1) Maize shall be sold either in bulk or, subject to subregulation (2), in grain bags.

- (2) Where maize is sold in grain bags, such bags shall -
- (a) comply with the specifications prescribed by subregulation (3);
 - (b) be either new or in a good used condition;
 - (c) be strong enough for the conveyance of 70 kg net mass of maize;
 - (d) not be so weathered or worn that it will break during normal handling or, when the grain bag is empty, will tear if one end is held down with the flat heel and the other end is pulled by hand;

- (e) be clean and not be stained by any colouring substance or be impregnated by any liquid capable of imparting stains, excluding trade marks or normal discolouration due to exposure to the sun; and
 - (f) be free from holes, but may be darned or patched in accordance with the provisions of subregulation (4).
- (3) Grain bags used for the packing of maize shall be bags woven with warp and weft threads (porter and shot) -
- (a) in the case of bags manufactured from jute or partially from jute and partially from phormium, have an inner length of between 1 055 mm and 1 080 mm, an inner width of between 590 mm and 610 mm, and not less than 32 warp threads and 32 weft threads per 100 mm;
 - (b) in the case of bags manufactured from phormium, have an inner length of between 1 055 mm and 1 080 mm, an inner width of between 590 mm and 610 mm, and not less than 36 warp threads and 40 weft threads per 100 mm; and
 - (c) in the case of bags manufactured from not less than 85 percent of polypropylene, have an inner length of between 1 020 mm and 1 040 mm, and an inner width of between 660 mm and 680 mm.
- (4) Subject to subregulation (5), holes occurring in a grain bag which complies with the specifications prescribed by subregulation (3), may -
- (a) in the case of bags manufactured from either jute or phormium, or partially from jute and partially from phormium -
 - (i) be darned with jute twine and hand-sewn;
 - (ii) be machine-darned with twine of which the tensile strength is not less than 40 N;
 - (iii) be patched by means of a patch, of the same material from which that bag is manufactured, sewn over each such hole, either by hand with jute twine or with a machine with twine of which the tensile strength is not less than 40 N; or
 - (iv) be patched by means of a patch of material contemplated in subparagraph (iii) affixed with adhesive over each such hole;
 - (b) in the case of bags manufactured from not less than 85 percent of polypropylene -
 - (i) be machine-darned with twine of which the tensile strength is not less than 40 N; or
 - (ii) be patched by means of a patch, of the same material from which that bag is manufactured, sewn over each such hole, either by hand or with a machine with twine of which the tensile strength is not less than 40 N.

(5) When holes occurring in a grain bag are darned or patched in accordance with the provisions of subregulation (4) -

- (a) none of the darns shall exceed 26 cm²;
- (b) the darns shall overlap the holes on all sides by at least 13 mm;
- (c) the darns shall correspond in closeness to the weave of the particular bag;
- (d) the darns shall not cause the material of the bag concerned to pull together to such extent that the strands of the material are displaced or the darns or such strands snap when the bag is filled with maize;
- (e) no patch used shall exceed 39 cm², except at the mouth of a bag where a patch of not more than 38 mm by 254 mm may, subject to paragraphs (f) and (g), be used, but not more than two such patches, one on each side of the bag, shall be so used;
- (f) patches affixed by means of an adhesive shall not be affixed within 150 mm of the mouth opening of a bag;
- (g) the mouth section of a grain bag may not be replaced;
- (h) patches, whether sewn or affixed, shall not overlap.

CALCULATION AND TESTING METHODS

Sampling and determination of defects

7. In the determination of the grade of maize the following methods shall be followed -

- (a) **Sampling** — Samples of maize taken for the purpose of grading shall be taken in such manner as to be representative of such maize.
- (b) **Determination of percentage (mass by mass) of defective kernels** — The percentage (mass by mass) of defective kernels shall be determined by screening a sample of not less than 100 g (taken in accordance with the provisions of paragraph (a)) through a screen with 6,35 mm round holes and hand picking the remaining portion and by calculating the mass of the defective kernels thus hand-picked, together with the mass of the maize kernels and pieces of maize kernels that passed through the screen, as a percentage of the total mass of the sample.
- (c) **Determination of percentage (mass by mass) kernels of another colour** — The percentage (mass by mass) kernels of another colour shall be determined by separating by hand from a sample of 200 g (taken in the manner prescribed in paragraph (a)) the maize kernels of another colour and by calculating the mass of such kernels of another colour as a percentage of the total mass of the sample.

- (d) Determination of percentage (mass by mass) of foreign matter — The percentage (mass by mass) of foreign matter shall be determined by separation by hand from a sample of at least 200 g (taken in the manner prescribed in paragraph (a)) the foreign matter and by calculating the mass of such foreign matter as a percentage of the total mass of the sample.
- (e) Determination of percentage (mass by mass) of pinked kernels — The percentage (mass by mass) of pinked kernels shall be determined by separating by hand from a sample of 100 g (taken in the manner prescribed in paragraph (a)) the pinked kernels and by calculating the mass of such pinked kernels as a percentage of the total mass of the sample.

Determination of mass of samples

8. The scale used for the determination of the mass of a sample of maize or of kernels of another colour, pinked kernels, defective kernels or foreign matter in the sample shall be such that the relevant mass can be accurately determined to within 0,5 g.

Determination of the net mass of maize

9. The net mass of maize shall be determined by subtracting from the total mass of the maize -

- (a) in the case of maize of which the moisture content at the time of the determination exceeds 12,5 percent, the mass of the moisture exceeding 12,5 percent; and
- (b) in the case of maize contained in grain bags -
 - (i) 1 kg for each such grain bag if the bag is manufactured from jute or phormium or partially from jute and partially from phormium; and
 - (ii) 200 g for each such grain bag if the bag is manufactured from at least 85 percent polypropylene.

Determination of moisture content

10. (1) The moisture content of a quantity of maize shall be determined in accordance with the provisions of subregulation (2) or (3).

(2) If a Marconi moisture meter Model TF 933, TF 933A, TF 933B or TF 933C is used to determine the moisture content, the following procedure shall be followed:

- (a) Take from a portion of the quantity, from which all foreign matter has been removed, a working sample of between 70 g and 80 g of maize.

- (b) Mill the working sample in a clean, dry mill that is suitable for this purpose -
 - (i) at a rate that will prevent the temperature of the milled maize from increasing more than 10°C above the ambient temperature during the milling process; and
 - (ii) to such extent that at least 90 percent of the milled maize will pass through a sieve with a wire cloth screening bottom with 2 mm apertures and not more than 75 percent thereof through a sieve with such a screening bottom with 1 mm apertures.
 - (c) Place the milled working sample forthwith in a dry glass jar with a screwtop and a capacity of between 350 ml and 450 ml.
 - (d) Screw the top tight and mix the contents of the glass jar thoroughly by turning and tilting it simultaneously for at least 30 seconds.
 - (e) Set up the moisture meter in accordance with the directions for use thereof, test the operation thereof and calibrate it if necessary.
 - (f) In accordance with the directions for use of the moisture meter, measure off from the milled working sample the required quantity and prepare and place it in the moisture meter.
 - (g) Activate the moisture meter in accordance with the directions for use thereof, take the dial reading on the moisture meter and at the same time determine the ambient temperature in the immediate vicinity of the moisture meter.
 - (h) By using the conversion table set out in the Annexure to these regulations, determine the converted percentage in accordance with the relevant dial reading obtained in accordance with paragraph (g);
 - (i) Adjust the percentage so determined for temperature by -
 - (i) increasing that percentage by 0,1 percent for each degree Celsius that the ambient temperature is below 20°C; and
 - (ii) reducing that percentage by 0,1 percent for each degree Celsius that the ambient temperature is above 20°C.
 - (j) Subject to the provisions of subregulation (4), the percentage adjusted in terms of paragraph (i), shall represent the moisture content the quantity of maize concerned.
- (3) If a Sinar Datatec moisture meter Model P25 or C6 is used to determine moisture content, the following procedure shall be followed:
- (a) Take from a portion of the quantity, from which all foreign matter has been removed, a working sample approximately 200 g or 300 ml.

- (b) Set up the moisture meter in accordance with the directions for use thereof, test the operation thereof and calibrate it if necessary.
 - (c) Prepare and place the working sample in the moisture meter in accordance with the directions for use thereof.
 - (d) Activate the moisture meter in accordance with the directions for use thereof and take the reading of the moisture percentage on the meter.
 - (e) Subject to the provisions of subregulation (4), the moisture percentage on the meter shall represent the moisture content of the quantity of maize concerned.
- (4) If the moisture content of a quantity of maize, as determined in accordance with the provisions of subregulation (2) or (3), exceeds the maximum permissible moisture content for maize -
- (a) a further determination of the moisture content of the quantity concerned may be made at the request of the owner thereof;
 - (b) such further determination shall be done with another working sample of the quantity concerned in the manner set out in subregulation (2) or (3); and
 - (c) the average of the percentage calculated or obtained, as the case may be, during the two determinations concerned, shall represent the moisture content of the quantity of maize concerned.

ANNEXURE

CONVERSION TABLE

Conversion of dial reading on Marconi Moisture Meter
to percentage moisture

Dial reading	Converted percentage	Dial reading	Converted percentage
1	2	1	2
0	8,6	26	13,1
1	8,8	27	13,4
2	8,9	28	13,6
3	9,0	29	13,8
4	9,2	30	14,0
5	9,3	31	14,2
6	9,5	32	14,5
7	9,6	33	14,7
8	9,8	34	14,9
9	10,0	35	15,1
10	10,1	36	15,4
11	10,3	37	15,7
12	10,5	38	16,0
13	10,6	39	16,3
14	10,8	40	16,6
15	11,0	41	16,8
16	11,2	42	17,1
17	11,3	43	17,4
18	11,5	44	17,7
19	11,7	45	18,0
20	12,0	46	18,3
21	12,2	47	18,6
22	12,3	48	19,0
23	12,5	49	19,4
24	12,7	50	19,9
25	12,9	51	20,3