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Second Edition

Chicken eggs - Specification



**Kenya Bureau of
Standards**
Standards for Quality life

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Foreword

This Kenya Standard was prepared by the **Meat and Poultry products** Technical Committee under the guidance of the Standards Projects Committee, and it is in accordance with the procedures of the Kenya Bureau of Standards

Chicken eggs are a major source of animal protein for human consumption in Kenya. They are not graded prior to being offered for sale and consumers are not assured of their quality. The Kenya Standard prescribes general requirements for grading fresh chicken eggs. It will assist the producer to maintain production of good quality (grade) eggs. It is hoped that it will also create price 'stratification' for eggs of different grades.

During the preparation of this Kenya standard, reference was made to the following publications:

Malaysian Standard: MS 680: 1980 Specification for chicken eggs.

KS 05-220: Methods for the microbiological examination of foods.

Acknowledgement is hereby made for the assistance derived from this (these) source (s)

Chicken eggs - Specification

1 Scope

This standard prescribes requirements and grading edible chicken eggs in-shell intended for human consumption

2 Normative references

The following referenced documents 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, see [ISO/IEC Directives, Part 2](#).

- I. KS EAS 38, Labelling of pre-packaged foods
- II. KS EAS 39, Hygiene in the food and drink manufacturing industry — Code of practice
- III. CAC/RCP 1-1969, Rev. 4-20031: Recommended International Code of Practice General Principles of Food Hygiene

3 Terms and definitions

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

- 3.1**
- air cell** — The air space between the inner and outer shell membranes found at the larger end of the egg.
- candling** — The process of determining the interior quality and soundness of the shell of an egg by the use of candling apparatus.
- check** — An egg that has a broken shell or crack in the shell but with its shell membrane still intact, and its contents do not leak.
- clean** — An egg whose shell must be unbroken and is free from foreign material and from stains and discolorations that are readily visible.
- dirty** — An egg whose shell must be unbroken and has adhering dirt and/or stains covering more than of the shell surface.
- egg grading** — The grouping of eggs into lots having similar characteristics such as colour, weight and quality
- egg white or albumen** — The jelly-like substance surrounding the yolk in the egg.
- leaker** — An egg that has a break or crack in the shell and shell membrane to the extent that the contents are exuding, or free to exude, through the shell. An egg which has a portion of the shell missing (in excess of an area 0.5 cm²) is considered a leaker even though the membrane is intact.
- loss** — An egg that is inedible, smashed or broken so that the entire contents are leaking, contaminated or containing bloody whites, large blood spots, large unsightly meat spots or other foreign material.
- smashed egg— An egg whose shell is crushed or shattered,
- sound** — An egg whose shell is unbroken and whose internal qualities are fit or human consumption.
- yolk** — The yellowish spheroidal mass of food material surrounded by the white in the egg.systematic and functionally independent examination to determine whether quality and food safety activities and results comply

with planned procedures and whether these procedures are implemented effectively and are suitable to achieve objectives.

4 General requirements

4.1 Classification

For the purposes of this standard, eggs shall be classified into two classes:

1. **Class A** or “fresh” eggs are for direct human consumption and for use in food industries.
2. **Class B** eggs are for use in food industries.

4.2 Minimum requirements

The eggs shall be sound and fit for human consumption and shall not:

- (a) Be damaged (cracked or broken);
- (b) Have a soiled shell,
- (c) Contain visible foreign matter at candling
- (d) Have an odour
- (e) Have surface moisture
- (f) musty or mouldy
- (g) have been in an incubator
- (h) be adulterated.

4.3 Quality Requirements

4.3.1 Internal quality of eggs

The candling process can be used for examining the internal quality of eggs when required.

The eggs shall be free from meat spots, blood spots (aggregating not more than 0.3 cm in diameter), diffused blood, foreign substances and abnormalities.

Each egg shall have space translucent, or faintly visible, yolk in the center of the egg when viewed through candling apparatus.

Each egg shall have a translucent and firm white, and an air space whose depth depends on the grade of the egg.

4.3.2 External Quality of eggs

The shells of the eggs shall not be misshapen, rough, thin, cracked or broken, and shall be reasonably free from stains, dirt and other foreign matter.

4.4 Storage of eggs

The eggs shall be freshly laid, unsoiled and stored under recommended temperatures and humidity.

Fresh eggs shall be eggs that are of recent production. They shall not have been held in excess of 30 days if kept at 15 °C and below and 14 days if kept at between 15 °C and 25 °C, and shall have been handled under temperature and humidity conditions which will maintain their quality.

5. Safety Requirements

The eggs shall be free from any pathogenic microbial organisms and from harmful contamination.

Chicken eggs shall comply with microbial limits given in Table 1.

TABLE 1: MICROBIAL LIMITS TABLE

SI No.	Microorganism	Limits				Test Method
		n	c	m	M	
I.	Total plate counts	5	2	5x10 ⁴	10 ⁶	KS ISO 4833
II.	Coliforms	5	2	10	10 ³	KS ISO 21528
III.	Salmonella	10	0	0		KS ISO 6579

NOTES:

n = No. of samples

c = the maximum

m the value at, or below, which no concern is recognized

M= the value below which the lot is rejected

6. GRADING

The eggs may be classified into categories based on the weight, internal quality and shell colour.

6.1 Weight — The eggs shall be graded as shown in Table 2.

Table 2: Weight classification of eggs

Category	Weight per egg (g)
Extra large (I)	More than 61
Large (II)	55 to 61
Medium (III)	48 to 54
Small (IV)	41 to 47
Very small (V)	Less than 41

6.2 Internal Quality — There shall be four (4) major standards of quality, A, B, C and D of individual eggs

based on interior factors such as condition of the white and yolk, the size and condition of the air cell and exterior factors of cleanliness and soundness of the shell (see Table 3).

6.3 Shell Colour

(a) *White* — All eggs shall be of the standard chalky white colour.

(b) *Brown* — All eggs shall be brownish, including the dark cream browns, and any variation in the shade of brown eggshell.

Tinted — Egg shell shall be white with brown or black spots; or brown with white or black spots.

Eggs may be clean, dirty, check, leaker or loss, which are also descriptive terms for quality.

Table 3: Standards or Quality of individual eggs

Quality factor	Specification for each quality factor			
	A	B	C	D
Shell	Clean, Unbroken Practically normal	Clean, Unbroken Practically normal	Clean to slightly Stained, Unbroken, May be slightly abnormal	Clean to moderately stained, Unbroken, May be abnormal
Air cell	0.30 cm or less in depth, Practically regular	0.5 cm or less in depth, Practically regular	1 cm or less in depth May be free/loose bubbly	May be over 1 cm in depth, May be free, loose or bubbly
White	Clear, Clear	Clear, May be reasonably firm	Clear, May be slightly weak	May be weak and watery, Shall blood clots or spots may be present.
Yolk	Outline slightly defined Practically free from defects	Outline may be fairly well defined, Practically free from defects	Outline may be well defined, May be slightly enlarged and flattened, May show definite but not serious defects.	Outline may be plainly visible, May be enlarged and flattened, may show clearly visible germ development but no blood, May show other serious defects.

Eggs for wholesale shall be grouped and graded in accordance with the specification given in Table 4.

TABLE 4. GRADE CLASSIFICATION FOR EGGS

GRADE	QUALITY AT LEAST 80 % (LOT AVERAGE SHALL BE ...)	TOLERANCE PERMITTED	
		%	Quality
A	A	Not over 7	B
B	B or better	Not over 7	C
C	C or better	Not over 5	D Dirty or check
D	D or better	Not over 5	Dirty or check

The final grading of eggs shall be as shown in Table 5

TABLE 5: Aggregate classification of eggs

Grade	Grade Description
AI, AII, AIII, AIV, AV	Extra Large, Large, Medium, Small, Very Small, with internal quality A, respectively.
BI, BII, BIII, BIV, BV	Extra Large, Medium, Small, very Small, with internal quality B, respectively.
CI, CII, CIII, CIV, CV	Extra Large, Large, Medium, Small, Very Small, with internal quality C.
DI, DII, DIII, DIV, DV	Extra Large, Large, Medium, Small, Very Small, with internal quality D.

7. PACKING

7.1 Eggs shall be packed with their small ends facing down. They shall be packed in cartons, cases or any other appropriate containers.

7.1.1 *Inner packing cartons* — The cartons shall be new, standard, commercial plastic, or paper, cartons (or moulded trays) to suit size of grade.

7.1.2 *Outer Packing Cases* — Eggs numbering 360 (30 dozens) shall be packed in nailed wooden boxes or fibreboard boxes. The boxes shall be furnished with a divider forming two internal compartments.

7.1.3 *Small Packaged* — Eggs shall be packed in moulded paper or plastic trays, each tray holding ½ dozen, 1 dozen or 2½ dozen eggs.

8. MARKING/LABELLING

8.1 Large Packages — Each carton or case shall be suitably marked so as to give the following

information.

- (i) Standard grade of the eggs;
- (ii) Number of the eggs;
- (iii) Net weight in kilograms;
- (iv) Date of collection;
- (v) Date of packing;
- (vi) Name and address of producer;
- vii) Declaration use not later than (date) if stored at 25 °C (room temperature).

8.2 SMALL PACKAGE — Each egg tray shall have a label attached to a suitable conspicuous side so as to give the following information:

- (i) Standard grade of the eggs;
- (ii) Number of the eggs;
- (iii) Date of collection;
- (iv) Declaration use not later than (date) if stored 25 °C (room temperature).

8.3 Cases for distant markets shall be marked with the declaration “EGGS HANDLE WITH CARE” in bold letters with an arrow pointing to the top of the case. In addition, the container shall have the words ‘THIS SIDE UP’ in letters 2.5 cm high.]

Annex A

APPENDIX A

DESCRIPTION FOR INDIVIDUAL EGGS

A1. EXTERIOR QUALITY DESCRIPTION

A1.1 Shell Shape and Texture

- (i) Normal eggs shall have an oval shape with one end larger than the other.
- (ii) There shall be three (3) degrees of variation in the shape of an egg as follows:
 - (a) *Normal* — A shell that approximates the usual shape and is of good even texture and strength, and free from rough areas or thin spots. Slight ridges and rough areas that do not materially affect the shape, texture and strength of the shell are permitted.
 - (b) *Slightly abnormal* — A shell that is unusual in shape or that may be slightly faulty in texture or strength. It may show definite ridges but not pronounced thin spots or rough areas.
 - (c) *Abnormal* — A shell that is decidedly misshapen or faulty in texture or strength, or that may show pronounced thin spots, ridges or rough areas.

A1.1.1 Shell Cleanliness — The following terms shall be descriptive of shell cleanliness:

- (a) *Clean* — A shell that is free from foreign materials and from stains or discolourations that are readily visible. An egg may be considered clean if it has only very small specks or stains and if such specks or stains are not of sufficient number or intensity to detract from the generally clean appearance of the egg.
- (b) *Moderately stained* — A shell that is free from adhering dirt, but which has stains of moderate degree covering not more than $\frac{1}{4}$ of the shell surface.

INTERIOR QUALITY DESCRIPTION

A2.1 Air Cell — The following terms shall be descriptive of the air cell:

- (i) *Practically regular* — An air cell that maintains a practically fixed position in the egg and shows a fairly oval outline with not more than 0.05 cm movement in any direction when the egg is viewed through a candling apparatus.
- (ii) *Free loose air cell* — An air cell that moves freely towards the uppermost point if the egg is rotated slowly. The shell membranes are intact by the air cell moves freely in any direction between them.
- (iii) *Bubbly air cell* — A ruptured air cell resulting in one or more small separate air bubbles, usually floating beneath the main air cell.

A2.1.1 Meaning Air Cell Depth — The air cell is the air space between shell membrane, normally in the large end of the egg.

Depth is the only quality factor considered for the air cell. The depth of the air cell is the distance from its top to the bottom when the egg is held air cell upwards. It is measured using an official air cell gauge at the point of greatest distance between the top of the cell and an imaginary plane passing through the egg at the lower edge of the air cell where it touches the shell (see Appendix B).

Candling may be used together with a micrometer to measure the air cell depth.

A2.2 Yolk — There shall be 3 factors to be considered in judging egg quality by the yolk. These are:

A2.2.1 Distinctness of Yolk Shadow Outline — The term that shall be used to describe the three (3) degrees of distinctness of the yolk shadow outline in the standards of quality for eggs are as follows:

(a) *Outline slightly defined* — A yolk outline that is indistinctly indicated and appears to blend into the surrounding white when the egg is viewed through a candling apparatus.

(b) *Outline fairly well-defined* — A yolk outline that is discernible but not clearly outlined when the egg is viewed through a candling apparatus.

(c) *Outline well-defined* — A yolk outline that is quite definite and distinct when the egg is viewed through a candling apparatus.

A2.2.2 Size and Shape of Yolk — The terms that shall be used to describe yolk size and shape in the standards of quality for eggs are as follows:

(a) *Round and firm* — A yolk having the quality characteristics of newly laid eggs.

(b) *Slightly enlarged and slightly flattened* — A yolk in which the membranes and tissues have weakened, causing it to appear slightly flattened.

(c) *Enlarged and flattened* — A yolk in which the yolk membrane and tissues have weakened and moisture has been absorbed from the white to such an extent that it appears definitely enlarged and flat.

(d) *Defects and embryonic development* — The terms that shall be used to describe yolk defects are as follows:

Practically free from defects — A yolk that may show no embryonic development, but may show other very slight defects on its surface.

(ii) *Definite but no serious defects* — A yolk that may show definite spots or areas on its surface, but with only slight indications of embryonic development or other pronounced or serious defects.

(iii) *Serious defects* — A yolk that shows well-developed spots or areas, and other serious defects, that do not render the egg inedible.

(iv) *Clearly visible embryonic development* — Development of the blastoderm on the yolk that has progressed to the point where it is plainly visible as a circular area or spot but with no blood evident.

(v) *Blood due to embryonic development* — Blood caused by development of the embryo in a fertile egg to the point where it is visible as a definite line or as a blood ring.

A2.3 Egg White — The following terms shall be descriptive of egg white:

(i) *Clear* — A white that is free from discolourations or from any foreign bodies flattening in it.

(ii) *Firm* — A white that is sufficiently thick or viscous to prevent the yolk outline from being more than slightly defined, or indistinctly indicated, when the egg is viewed through a candling apparatus.

(iii) *Reasonably firm* — A white that is less thick or viscous than a firm white. A reasonably firm white permits the yolk to approach the shell closely, which results in fairly well-defined yolk outline when the egg is viewed through a candling apparatus.

(iv) *Slightly weak* — A white that is lacking in thickness or viscosity to an extent that causes the yolk outline to appear well-defined when the egg is viewed through a candling apparatus.

(v) *Weak and watery* — A white that is thin and generally lacking in viscosity. A weak and watery white permits the yolk to approach the shell closely, thus causing the yolk outline to appear plainly visible and dark when the egg is viewed through a candling apparatus.

(vi) Blood clots and spots —Blood clots or spots, commonly called meat spots, may be found on the surface of the yolk or floating in the white. If they are small) aggregating not more than 0.30 cm in diameter) the egg may be classed as 'D Quality'. If larger, or showing diffusion of blood in the white surrounding them, the egg shall be classed as 'loss'.

I. |

PUBLIC REVIEW DRAFT

Bibliography

- [1] ISO #####-#, *General title — Part #: Title of part*
- [2] ISO #####-##:20##, *General title — Part ##: Title of part*

A **Bibliography**, if present, shall appear after the last annex.

The bibliography may include

- documents that are not publicly available,
- documents which are only cited in an informative manner, and
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For online referenced documents, information sufficient to identify and locate the source shall be provided. Preferably, the primary source of the referenced document should be cited, in order to ensure traceability. Furthermore, the reference should, as far as possible, remain valid for the expected life of the document. The reference shall include the method of access to the referenced document and the full network address.]