KENYA STANDARD **KS 2873:2019**

ICS 85.060; 67

Hermetic Storage Bags —Specification

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National cereals and produce board
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REVISION OF KENYA STANDARDS

In order to keep abreast of progress in industry, Kenya Standards shall be regularly reviewed. Suggestions for improvements to published standards, addressed to the Managing Director, Kenya Bureau of Standards, are welcome.

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Foreword

This Kenya Standard was prepared by the multi- Technical Committee on Packaging (053), hard fibre (066) and Cereals and Pulses (001) under the guidance of the Standards Projects Committee, and it is in accordance with the procedures of the Kenya Bureau of Standards.

Development of this standard was necessitated by the need to use hermetic storage technologies for storage of dried food commodities, their derived products and seeds in order to reduce post-harvest losses and increase the shelf life without the need to use pesticides.

Hermetic bags are sold to food value chains in Kenya with users benefiting from lower post-harvest losses, maintain qualities of stored commodities and leading to Increased food security, income, nutrition and health.

In the manufacturing sector, the bags are used to preserve products that require protection from moisture, water vapour and controlled oxygen permeability.

As the market for hermetic storage bags expands, there is a risk of substandard products being imported or manufactured locally and hence undermine proper storage of dry food commodities and their derived product.

Parameters covered in the standard include, water vapour and Oxygen transmission rate, chemical, physical and mechanical properties of the hermetic bags.

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

KS 482, Specification for woven polyolefin sacks for seeds.

Acknowledgement is hereby made for the assistance derived from this source.

Hermetic Storage Bags —Specification

1 Scope

This Kenya Standard prescribes the requirements and test methods for hermetic bags for storage of dried food commodities, derived products and seeds.

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.

KS 1056-1 Specification for woven wrapping cloth - Part 1: Polypropylene cloth

KS 1037:1990 Methods of test for woven bags

KS 482, Specification for woven polyolefin sacks for seeds

ASTM D 398-13 Determination of water vapour transmission rate (WVTR) -- Gravimetric (dish) method

ISO 4591 Plastics -- Film and sheeting -- Determination of average thickness of a sample, and average thickness and yield of a roll, by gravimetric techniques (gravimetric thickness)

ISO 2556 Plastics -- Determination of the gas transmission rate of films and thin sheets under atmospheric pressure -- Manometric method

ISO 7765 Plastic film and sheeting-Determination of Impact resistance by free falling dart method part 2: Instrumented punctured test

ISO 6383-2 Plastic film and sheeting-Determination of tear resistance part 2: Elmendorf-method

ISO 7965-2 Sack-drop test part 2: -Sacks made from thermoplastic flexible film

ISO 22198 Textile Fabrics-Determination of width and length

ISO 7211-5 Textile-woven Fabrics-Construction-methods of analysis-Part 5: Determination of linear density of yearn removed from fabrics.

ISO 3801 Textile-woven Fabrics-Determination of mass per unit length and mass per unit area

ISO 13934-1:2013 Textiles -- Tensile properties of fabrics -- Part 1: Determination of maximum force and elongation at maximum force using the strip method

KS ISO 177 Plastics — Determination of migration of plasticizers

ASTM D-3985-95 Standard Test Method for Oxygen Gas Transmission Rate Through Plastic Film and Sheeting Using a Coulometric Sensor

ISO 2062:2009 Textiles -- Yarns from packages -- Determination of single-end breaking force and elongation at break using constant rate of extension (CRE) tester

ASTM F 1927 - 07 Standard Test Method for Determination of Oxygen Gas Transmission Rate, Permeability and Permeance at Controlled Relative Humidity Through Barrier Materials Using a Coulometric Detector

ASTM F1306 – 90 Standard Test Method for Slow Rate Penetration Resistance of Flexible Barrier Films and Laminates

ASTM D882-18 Standard Test Method for Tensile Properties of thin Plastic Sheeting

3. Terms and definition

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

3.1
grain
Small hard dry seed with or without an attached hull or fruit layer harvested for human or animal consumption

3.2

hermetic storage bag

A sealed storage system based on the generation of an oxygen and moisture depleted and carbon dioxide enriched inter granular atmosphere by respiration of the living organisms in the dried food commodities and derived products.

3.3
food grade material

packaging material, made of substances which are safe and suitable for the Intended use and which will not Impart any toxic substances or undesirable odour or flavor to the products.

3.4

Oxygen transmission rate (OTR)

Quantity of oxygen transmitted through unit area of a test specimen in unit time under specified conditions of temperature, humidity and thickness

3.5
Water vapour transmission rate (WVTR)

quantity of water vapour transmitted through unit area of a test specimen in unit time under specified conditions of temperature, humidity and thickness

3.6
dry food commodity
cereals and pulses whose moisture content is within acceptable limits as specified in the Standards

3.7
derived products

processed products from cereals and pulses

4 Requirements

4.1 General requirements for outer bag

4.1.1 The bag shall be made from woven polypropylene tapes of virgin resin

4.1.2 Stitching thread

The stitching thread shall be made from either polypropylene or polyester.

4.1.3 Edge sealing

All raw edges of the bags shall be heat sealed or hemmed to prevent fraying

4.1.4 Base Closure

The closure shall be effected either by a turned-over and stitched seam or by bonding. Where the base closure is bonded, the seam shall be effected by applying capping tape over the ends of the sack and securing by means of an adhesive.

4.1.5 Longitudinal Seams

longitudinal seams shall not be used in the manufacture of hermetic storage bags

4.2. General requirements for hermetic liner

4.2.1 The liner shall be made from virgin polymer resins that are food grade material

4.2.2 The joints of the liners shall be heat sealed.

4.3. General requirements for closures of hermetic liners

The liner shall have a closing mechanism to secure and maintain the hermetic condition.

4.4. General requirements for closures of woven polypropylene bag

The bag shall have a closing mechanism to secure and maintain the contents without puncturing the liner.

5. Specific requirements

5.1 Specific requirements for woven polypropylene bags

Woven polypylene bags shall meet the physical requirements as specified in table

Table 1 — Specific requirements for polypropylene bags

S/No.	Characteristic		Requirements	Test method
i.	Degree of coverage, %, min.	Warp	100	KS 1056-1
		weft	100	
ii.	Breaking Force of the Sacking,N, min	warp	600	KS ISO 13934-1
		weft	600	
iii.	Break strength of the tape (yarn),N,min		20	KS ISO 2062
iv.	Elongation at break of the tape,%, min		20	KS ISO 2062
v.	Linear density,denier,min.		700	ISO 7211 Part 5
vi.	Mass per unit area of the sacking ,g/m^2,min		70	KS ISO 3801

vii.	Stitch Density per 10 cm,min	12	KS 482
viii.	Seam Strength,N.min.	480	KS 1037
ix.	Turned-over and stitched seam	The turn-over shall be 2 cm minimum and the stitch line shall be 1 ± 0.3 cm from the base so formed and shall pass through all the four thicknesses of the fabrics.	KS 482

5.2 Hermetic liner

When tested in accordance with the methods specified in Table 2, the hermetic liner shall comply with the requirements specified therein

Table 2 — Specific requirements for hermetic liner

S/No.	Characteristic	Requirements	Test method
i.	Thickness , µm ,min.	65 µm	KS ISO 4591
ii.	OTR, (cc/m^2/day),max	250	ISO 2556 ASTM D-3985-95 ASTMF-1927-98((23^{0}C and 65% RH)
iii.	WVTR, (g/m^2/day),max	10	ISO 2528
iv.	Impact resistance, g,min.	350	ISO 7765-2
v.	Puncture resistance, N,min.	50	ISO 6383-2 ASTM F 1306-90

5.3 Specific requirements for fully assembled hermetic storage bag

5.3.1 Drop test

5.3.1.1 Butt dropping

When tested in accordance to ISO 7965-2 at a height of 1.20m on the bottom and the top of the bag, after each drop, there shall be no rupture or loss of contents.

5.3.1.2 -Flat dropping

When tested in accordance to ISO 7965-2 at a height of 1.60m twice on one flat face and twice on the opposite flat face., there shall be no rupture or loss of contents.

5.3.2 Dimension and capacity

When tested in accordance to ISO 22198 the nominal dimensions of the bags shall be as declared subject to a tolerance of ± 2 cm and capacity as stated.

5.3.3 Food grade requirements

5.3.3.1 When tested in accordance with KS ISO 177 the bag shall not transfer toxic substances injurious to human on the packed products.

6 Packaging and Labelling

6.1 Packaging

6.1.1 Hermetic bags shall be packed in suitable materials that prevents it from damage, contamination during normal handling, storage and transportation.

6.1.2 The bags shall be packaged in agreed quantities between the buyer and seller

6.2 Labelling

6.2.1 Woven polypropylene

The woven polypropylene bag shall be legibly and indelibly marked with the following information on the outer.

i. Manufacturer's name, address and /or registered trade mark.

ii. Description of goods, "Hermetic Storage bag".

iii. Capacity of the hermetic bag in kg as dried maize equivalent, e.g. 25,50,90,100.

iv. Dimensions of the bag.

v. Declaration of the number of liners in the bag

vi. Batch number or code

vii. Instruction for correct use

vi. Instruction for storage and disposal of used bag.

vii. The declaration, 'country of manufacture and origin.

6.2.2 Liner

The liner shall be legibly and indelibly marked with the following information

i. Manufacturer's name, address and /or registered trade mark.

ii. Declaration, "Hermetic liner".

iii. Indication of the type of polymer resin used.

viii. Capacity of the liner in
ix. kg as dried maize equivalent, e.g. 25,50,90,100.

iv. Dimensions of the liners.

v. Batch number or code

vi. The declaration, ‘country of manufacture and origin

vii. Instruction for correct use, storage and disposal of the liner.

6.2.3 Bulk package

The bulk package shall be legibly and indelibly marked with the following information.

i. Manufacturer’s name, address and /or registered trade mark.

ii. Description of goods, “Hermetic Storage bags”.

iii. Capacity of the hermetic bags in Kg as dried maize equivalent e.g. 25,50,90,100.

iv. The quantities of the bags

v. Declaration of the number of liners in the bag

vi. Batch number or code

vii. Instruction for storage and disposal of bulk packaging material.

viii. The declaration, ‘country of manufacture and origin

