KENYA STANDARD

KS 2923-1:2020

ICS 55.080

First Edition

Tarpaulins for post-harvest handling of agricultural Produce **— Specification**

Part 1:

Woven High density Polyethylene

TECHNICAL COMMITTEE REPRESENTATION

The following organizations were represented on the Technical Committee:

Technical University of Kenya.
Government Chemist Department
Kenya Agriculture and Livestock Research Organization (KALRO)
Africa PVC Industries
Nairobi University —Department of Food Science
Environment Institute of Kenya,
Moi University—Department of Industrial and Textile Engineering
Tarpo Industries Ltd.,
Agroz Ltd Arusha
BUMA Holdings
One Acre Fund
Kenyatta University
A Plus Industries Ltd
Ministry of Agriculture
National Cereals and Produce Board (NCPB)
Redblum Industries Ltd
Government Chemist
National Public Health Laboratory
Moi University — Department of industrial and Textile Engineering
Kenya Bureau of Standards — Secretariat

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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Part 1:

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Foreword

This Kenya Standard was prepared by the TC 001 cereals and pulses, TC 66 Hard fibres and TC 053 Packaging Technical Committee under the guidance of the Standards Projects Committee, and it is in accordance with the procedures of the Kenya Bureau of Standard

KS 2923 consists of the following parts, under the general title; Tarpaulins for post-harvest handling of agricultural Produce

— *Part 1: Woven High density woven polyethylene*

— *Part 2:* Polyester fabric coated with Polyvinyl chloride (PVC

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

KS 1434 Specification for Coated Tarpaulin Fabrics

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

Introduction

A tarpaulin used for post-harvest handling of agricultural produce such as grains is a large sheet of flexible, water-resistant or waterproof material, often cloth such as polyester coated with polyurethane, of plastics such as polyethylene and polyvinyl chloride (pvc)

Development of this standard was necessitated by the need to protect farmers and users of tarpaulins mainly used as drying sheets for post-harvest handling of grains from substandard products and safety aspect in terms of heavy metal contamination used as printing inks and microbial contamination as a result of production and product handling. In most cases harvested agricultural produce have high moisture content for safe storage, that may result in migration of pigments, organic pollutants from tarpaulins during drying

Tarpaulins 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.

As the market for tarpaulins 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.

KS 2923-1: 2020

Tarpaulins for post-harvest handling of agricultural produce

Part 1:

Woven High density Polyethylene

1 Scope

This part of the Kenya Standard prescribes the requirements and test methods for tarpaulins made from woven high density polyethylene and are used for post-harvest handling of agricultural produce such as grains

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.

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 105 B02, Textiles — Tests for colour fastness — Part B02: Colour fastness to artificial light: Xenon arc fading lamp test

KS ISO 105 C10 Textiles — Tests for colour fastness — Part C10: Colour fastness to washing with soap or soap and soda

KS ISO 105 X12 Textiles — Tests for colour fastness — Part X12: Colour fastness to rubbing
KS ISO 811 Textile fabrics -Determination of resistance to water penetration -Hydrostatic pressure test.

KS ISO 2286-1 Rubber- or plastics-coated fabrics - Determination of roll characteristics -Part 1: Methods for determination of length, width and net mass

KS ISO 1421:2016 Rubber- or plastics-coated fabrics - Determination of tensile strength and elongation at break

KS ISO 4674-1:2016 Rubber-or plastics-coated Fabrics-Determination of tear Resistance-Part 1: Constant rate of tear methods.

KS ISO 22958: 2005 Textiles - Water resistance - Rain tests: exposure to a horizontal water spray.

ISO 24153 Random sampling and randomization procedures

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
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.

3.3
Base fabric
This is the inner material between the coatings.

3.4
Agricultural Produce
Any product or commodity form cultivated plants or animals intended for human consumption

4 Requirements

4.1 General requirements

4.1.1 The base fabric shall be woven from high density polyethylene (HDPE) tapes of virgin resin.

4.1.2 The base fabric shall be coated on both sides

4.1.3 Edge sealing

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

4.1.4 Finish
On visual examination, the coating of the material shall be uniformly applied and shall be free from cracks and flaws.

4.1.5 UV treatments
The tarpaulins shall be treated with UV stabilizers

5. Specific requirements

5.1 The Tarpaulins shall meet the physical requirements as specified in Table 1
5.2 The colorfastness requirements of tarpaulins shall be as specified in Table 2

Table 1 — Specific requirements for Woven High Density Polyethylene Tarpaulin

Characteristic		Requirements	Test method
Total mass per unit area, g/m^2, min.		140	KS ISO 2286-1
Loss of volatile matter, %, max		5	KS 1077-7 temperature Duration to be determined
Resistance to water penetration (hydrostatic test) cm head of water, min.		150	KS ISO 811-hydrostatic test
Water resistance, Rain test g, Max		1	KS ISO 22958
Breaking strength, N, min.	Warp	700	KS ISO 1421
	Weft	690	
Tear strength, N, min.	Warp	130	KS ISO 4674-1 Trouser shape
	Weft	130	
Retention of breaking strength after UV exposure ,min	Warp	85 percent of original actual value of the tarpaulin	Retention of breaking strength after UV exposure ,min

Table 2 — colourfastness requirements for Woven High Density Polyethylene Tarpaulin

Agency		Numerical rating (min)		Test method
		Change in colour	Staining	
Light		5	—	KS ISO 105 B02
Washing		4	4	KS ISO 105-C10
Rubbing	dry	4	4	KS ISO 105-X12
	wet	3-4	3-4	

5.3 Dimensions

When tested in accordance to KS ISO 2286-1 the nominal dimensions of the tarpaulins used in post-harvest handling of agricultural produce shall be as declared subject to a tolerance of ± 2 % of the declared dimensions

5.4 Food grade requirements

5.4.1 Overall migration

When tested in accordance with the method specified in FDEAS 985-1, woven high density polyethylene Tarpaulins shall comply with the overall migration limits of 60 mg/kg (max.)

5.4.2 Pigments, colorants and heavy metals

When tested in accordance with FDEAS 985-1, woven high density polyethylene Tarpaulins shall comply with the list and limits of the pigments, colorants and heavy metals specified therein.

6 Packaging

6.1. Woven high density polyethylene Tarpaulins shall be packed in materials that prevents it from damage, contamination during handling, storage and transportation.

7 Labelling

The woven high density polyethylene tarpaulin shall be legibly and indelibly marked with the following information

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

ii. Dimensions of woven high density polyethylene tarpaulin.

iii. Batch number

iv. Instruction for correct use

v. Instruction for storage

i. country of manufacture

7 SAMPLING

Sampling shall be done in accordance with ISO 24153.

7.1 Lot

7.1.1 The quantity of the same type and quality delivered to one buyer against one dispatch note shall constitute a lot.

7.1.2 The conformity of the lot to the requirements of this Standard shall be determined on the basis of tests carried out on the samples selected from the lot.

7.1.3 The number of pieces to be selected at random from a lot shall be in accordance with Table 3.

Table 3 Sampling size and permissible number of non-conforming pieces

Number of pieces in the lot	Sample size for visual inspection	Permissible no. Nonconforming pieces	Sub-sample size for testing
Up to 25	3	0	2
26 to 50	5	0	2
51 to 150	8	0	3
151 to 300	13	1	3
301 to 500	20	1	5
501 to 1000	32	2	5
1000 and above	50	3	8

Annex A
(normative)

UV resistance test

A.1TEST SPECIMENS
The test specimens for breaking strength shall be cut from the sample as specified in KS ISO 13934 (Part 1).

A.2TEST CONDITIONS

A.2.1 The test shall be carried out with Fluorescent-B lamp (313 nanometer or its equivalent).

A.2.2 The duration of the test shall be 144 h (that is 6 days).

A.2.3 The test cycle shall be 8 h at 60 ± 3°C with UV radiation alternating after 4 h at 50 ± 3°C with condensation.

A.2.4 Irradiation level throughout the test shall be maintained at 0.63 +0.03 W/m².

A.3 TEST PROCEDURE
A3.1 Determine the original average breaking strength of fabric specimens separately as per the test Specified in KS ISO 13934 (Part 1).

A3.2 Expose the specimens alternately to ultraviolet light alone and to condensation in one respective cycle.

A3.2.1 The type of fluorescent UV lamp, the timing of the UV exposure and the temperature of condensation shall be as specified in A-2

A3.3 Determine the average breaking strength of the specimens separately after UV exposure as KS ISO 13934 (Part 1).

A3.4 Determine the percent retention of original strength as follows:

Percent retention of original breaking strength $= \frac{b}{a} X\ 100$

Where

a = average breaking strength before UV exposure as obtained in A-3.1; and

b = average breaking strength after UV exposure as obtained in A-3.3.

NOTES
1 The UV source is an array of fluorescent lamps (with lamp emission concentrated in the UV range).
2 Condensation is produced by exposing the test surface to a heated, saturated mixture of air and water vapour, while the reverse side of the test specimen is exposed to the cooling influence of ambient room air.