KENYA STANDARD

DKS 1113-1:2022

ICS 59.080.20

Second Edition

Specification for staple spun yarns

Part 1: Cotton yarns

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Kenya Agricultural & Livestock Research Organization (KALRO)
Kenya Association of Manufacturers (KAM)
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Kenya Bureau of Standards, Popo Road, Off Mombasa Road,
P.O. Box 54974 - 00200, Nairobi, Kenya

+254 020 6948000, + 254 722202137, + 254 734600471

info@kebs.org

@KEBS_ke

kenya bureau of standards (kebs)

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Foreword

This Part 1 of this Kenya Standard was prepared by the Technical Committee on Yarns and Fibre under guidance of the Standards Projects Committee, and it is in accordance with the procedures of the Kenya Bureau of Standards.

Yarn quality affects not only the efficiency of fabric production but also the fabric quality. Yarn quality specification will therefore be of utmost importance and interest to the spinner, weaver, knitter and yarn merchant.

This Part 1 of this Kenya Standard has been developed with these interests in mind.

Yarns are produced in a wide range of counts (linear densities) or varying fibre blend compositions and proportions for various end-users. This Kenya Standard takes into consideration all the variations and specifies only the minimum requirements for essential quality characteristics of yarns.

This Second edition cancels and replaces the First edition (KS 1113-1:1993) which has been technically revised. The changes are as follows;

-Test methods in clauses 4, 5.1, 5.3, 5.5, 5.6 and 5.8 have been updated

-Formular for coefficient of variation of linear density has been corrected

-Requirement on fibre composition (clause 5.10) has been added

-Clause 7 on sampling have been added

-Method of determination of moisture regain have been added in annex A

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

KS 1113-1:1993 Specification for staple spun yarns Part 1. Cotton yarns

Acknowledgment is hereby made for assistance received from these sources.

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Specification for staple spun yarns — Part 1. Cotton yarns

1 Scope

This Part 1 of this Kenya Standard specifies the requirements, test methods and sampling method for 100 per cent cotton spun yarns.

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.

ASTM D2255*, Standard Test Method for Grading Spun Yarns for Appearance*

KS ISO 139, *Textiles — Standard atmospheres for conditioning and testing*

KS ISO 1139, *Textiles — Designation of yarns*

KS ISO 1144, *Textiles — Universal system for designating linear density (Tex System)*

KS ISO 2060, *Textiles — Yarn from packages — Determination of linear density (mass per unit length) by the skein method*

KS ISO 2061, *Textiles — Determination of twist in yarns — Direct counting method*

KS ISO 6741-1*, Textiles — Fibres and yarns — Determination of commercial mass of consignments — Part 1: Mass determination and calculations.*

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

KS ISO 16549, *Textiles — Unevenness of textile strands — Capacitance method*

3. Application

This Part 1 of this Kenya Standard applies to single-spun grey cotton yarns, except single-spun cotton slub yarns

4 Terms and definitions

For the purpose of this Part 1 of this Kenya Standard, the following definitions together with those given in KS ISO 1139 and KS ISO 1144 shall apply:

4.1 linear density — The mass per unit length of a yarn. It is expressed in tex or multiples or submultiples thereof.

4.2 tex — Number of grams per kilometre of yarn.

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4.3 breaking force — The maximum force applied to a specimen in a tensile test carried to rupture. It is expressed in Newtons, centiNewtons or milliNewtons.

4.4 tenacity — The ratio of the tension to the linear density of an unstrained specimen. It is expressed in Newtons per tex or centiNewtons per tex.

4.5 breaking tenacity — The tenacity corresponding to the breaking force.

NOTE: The breaking tenacity is calculated from the breaking force and the linear density of the unstrained specimen, or, for specimens of known linear density, obtained directly from tensile testing machines, which can be suitably adjusted to indicate tenacity instead of breaking force.

4.6 twist — The number of turns about the axis of a length of specimen equal to the nominal gauge length before untwisting. Twist shall preferably be expressed in turns per metre (t.p.m.) but may also be expressed in turns per centimetre (t.p.cm.).

4.7 elongation per cent — The increase in length of a specimen expressed as a percentage of the original length; extension per cent.

NOTE: In a tensile test, the elongation per cent, or extension per cent, is calculated on the basis of the nominal gauge length of a pre-tensioned specimen.

4.8 elongation at the breaking force — The elongation produced by the breaking force, i.e. the maximum force.

4.9 grey cotton yarn — Yarn as it leaves the spinning frame or winding frame without any bleaching, dyeing or any finishing treatment, and in the case of open-end yarn with or without waxing.

4.10 yarn packages — A length or lengths of yarn in a form suitable for use, handling, storing or shipping. Packages may be unsupported, such as balls, skeins or cakes or supported, such as bobbins, cops, cones, pirns, spools, tubes, or beams.

4.11 moisture regain — The mass of moisture present in a textile material expressed as a percentage of the oven-dry mass.

5 Requirements

5.1 Linear Density — The nominal linear density of the yarn shall be as declared, subject to a tolerance of ± 3 per cent. This shall be determined in accordance with KS ISO 2060

5.2 Coefficient of Variation of Linear Density — The coefficient of variation of the linear density of the yarn shall not exceed 3.5 per cent for carded yarns and 2.5 per cent for combed yarns. The coefficient of variation (C.V.) of the yarns shall be determined from the following formula:

$$CV = \frac{\delta}{\bar{x}} \times 100\%$$

where, $$\delta = \sqrt{\frac{\sum (\bar{x} - x)^2}{n-1}}$$

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where,

x = the linear density in tex of any yarn sample;

$\bar{x}$ = the mean linear density in tex of all the yarn samples;

n = the total number of samples; and

δ = the standard deviation in tex.

5.3 Yarn Twist — The turns per metre (or centimetre) in the yarn shall be as declared subject to a tolerance of ± 5 per cent. This shall be determined in accordance with KS ISO 2061

5.4 Elongation at the Breaking Force — The minimum elongation at the breaking force of the yarn shall be 4.5 per cent. This shall be determined in accordance with KS ISO 2062.

5.5 Breaking Tenacity — The minimum breaking tenacity of the yarn shall be as specified in Table 1. The breaking tenacity of the yarn shall be determined in accordance with KS ISO 2062

5.6 Yarn Unevenness (Irregularity) — The yarn unevenness in terms of coefficient variation (% C.V.) shall be determined in accordance with KS ISO 16549

5.6.1 Unevenness of Carded Ring Spun Yarns — The coefficient of variation (irregularity) of the carded ring spun yarns shall not exceed those specified in Table 2.

5.6.2 Unevenness of Combed Ring Spun Yarns — The coefficient of variation (irregularity) of the combed ring spun yarns shall not exceed those specified in Table 3.

5.6.3 Unevenness of Carded Rotor Spun Yarns — The coefficient of variations (irregularity) of the carded rotor spun yarns shall not exceed those specified in Table 4.

5.7 Moisture Regain — The moisture regain of the yarn shall not exceed 8.5 per cent. This shall be determined in accordance with Annex A.

5.8 Yarn Appearance — The appearance of the yarn when tested in accordance with ASTM D2255 shall be of a grade not lower than that specified in Table 5.

5.9 Package Mass — The mass of the package, conditioned as per KS ISO 139 shall be as declared subject to a tolerance of – 2 per cent.

5.10 The fibre composition and proportion of the yarn shall be 100% Cotton. This shall be determined in accordance with KS ISO 1833-11.

Table 1 — Requirement for Breaking Tenacity

SL NO	YARN TYPE	MINIMUM BREAKING TENACITY: CN/Tex	TEST METHOD
(i)	Combed ring spun for weaving	15.0	KS ISO 2062

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(ii)	Combed ring spun for knitting	14.0	
(iii)	Carded ring spun for weaving	13.5	
(iv)	Carded ring spun for knitting	13.0	
(v)	Carded rotor spun for weaving	10.5	
(vi)	Carded rotor spun for knitting	9.0	

Table 2 — Requirements for Unevenness for Carded Ring Spun Yarns

S/N	LINEAR DENSITY, Tex	C.V. % Max.	Test method
i.	Coarser than 60	15.5	KS ISO 16549
ii.	60-35	12.5	
iii.	33-25	13.5	
iv.	24-20	14.5	
v.	19-16	15.0	
vi.	15-13	15.5	
vii.	Finer than 13	15.8	

Table 3 — Requirements for Unevenness for Combed Ring Spun Yarns

S/N	LINEAR DENSITY, Tex	C.V. % Max.	Test Method
i.	24-20	10.5	KS ISO 16549
ii.	19-16	11.0	
iii.	15-13	12.5	
iv.	12-11	13.0	
v.	10-9	13.5	
vi.	8-7.6	14.0	
vii.	7-6.4	14.5	

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viii.	Finer than 6.4	15.0	

Table 4 — Requirements for Unevenness for Carded Rotor Spun Yarns

S/N	LINEAR DENSITY, Tex	C.V. % Max.	Test method
i.	Coarser than 60	11.0	KS ISO 16549
ii.	60-35	12.5	
iii.	33-25	13.5	
iv.	24-20	14.5	
v.	19-16	15.5	
vi.	15-13	16.0	

Table 5 — Requirements for Yarn Appearance

S/N	YARN TYPE AND COUNT (Tex)	GRADE
i.	Combed ring spun, all counts	B
ii.	Carded ring spun, counts coarser than 60	D
iii.	Carded ring spun, counts finer than 60	C
iv.	Carded rotor spun, all counts	C

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6 Wrapping and packing

Yarn package(s) shall be wrapped in suitable wrappers or packed in suitable containers to protect them from damage while being handled or while on transit or in storage.

6 Marking

6.1 Unit packages

Each unit package shall have a label bearing the following information:

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a) manufacturer's name and address or registered trade mark;
b) linear density in tex;
c) spinning method used, e.g. ring spun or rotor spun;
d) Whether carded or combed
e) name of material, i.e. 100 % cotton yarn;
f) package mass;
g) yarn twist in t.p.m or t.p.cm;
h) lot/batch number.
i) Whether waxed or not waxed (rotor spun yarns).
j) country of origin
k) Recommended end-use.

6.2 Bulk containers

Each bulk container shall have a label bearing the following information:

a) manufacture's name and address or registered trade mark;
b) name of material, i.e. 100 % cotton yarn;
c) linear density in tex;
d) quantity of pieces;
e) Whether carded or combed
f) spinning method used, e.g. ring spun or rotor spun;
g) gross mass of the container;
h) lot/batch number; and
i) country of origin

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7 Sampling

7.1 Lot

7.1.1 The quantity of cotton spun yarns of the same variety delivered to a buyer against a despatch note shall constitute the lot.

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

7.1.3 Unless otherwise agreed to between the buyer and the seller, the number of packs to be selected at random from a lot shall be as follows:

SN	Number of Packs in the Lot	Number of Packs to be Selected
i.	Upto 15	5
ii.	16-30	7

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iii.	31-50	10
iv.	51-100	15
v.	101-300	25
vi.	301 and above	30

7.1.4 **Acceptance criteria-** Acceptance shall be based on conformity of the lot to the requirements of this standard.

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ANNEX A

(Normative)

Determination of Moisture Regain

A.1 Principe

A known mass of yarns is dried and then the loss in mass expressed as a ratio of the dry mass.

A.2 Apparatus

A.2.1 Weighing balance, Capable of weighing to an accuracy of 0.001 g.

A.2.2 Drying Oven, well ventilated with a temperature of 102 °C to 105 °C

A.2.3 Desiccator, waterproof when sealed, will be used for transfer of analysed material and during weighing.

A.3 Procedure

A.3.1 From the sample under test draw at least three test specimens each weighing approximately 5 g.

A.3.2 Take a test specimen drawn as in A.3.1 and weigh it accurately *(M1)*

A.3.3 Dry it at a temperature of 102°C to 105°C until constant mass is obtained (see note)

A.3.4 Cool the test specimen in a desiccator and determine the oven-dry mass *(M2*).

NOTE The mass is usually regarded as constant if the loss between two successive weighing, taken at an interval of 30 min does not exceed 0.1 per cent of the first of the two values.

A.3.5 Similarly test the other test specimen(s).

A.4 Calculation

Moisture regain = $\frac{M1 - M2}{M2} X 100\%$

A.5 Report

Report the average of the value calculated in A.4 as the moisture regain in %.

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