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DRAFT EAST AFRICAN STANDARD

Yarn made from staple fibres — Specification — Part 1: Cotton yarn

EAST AFRICAN COMMUNITY

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Foreword

Development of the East African Standards has been necessitated by the need for harmonizing requirements governing quality of products and services in the East African Community. It is envisaged that through harmonized standardization, trade barriers that are encountered when goods and services are exchanged within the Community will be removed.

The Community has established an East African Standards Committee (EASC) mandated to develop and issue East African Standards (EAS). The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the public and private sector organizations in the community.

East African Standards are developed through Technical Committees that are representative of key stakeholders including government, academia, consumer groups, private sector and other interested parties. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalization of standards, in accordance with the Principles and procedures for development of East African Standards.

East African Standards are subject to review, to keep pace with technological advances. Users of the East African Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

The committee responsible for this document is Technical Committee EASC/TC 061, *Textiles, textile products and accessories*.

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DRAFT EAST AFRICAN STANDARD DEAS 1177-1: 2023

Yarn made from staple fibres — Specification — Part 1: Cotton yarn

1 Scope

This Draft East African Standard specifies requirements, sampling and test methods for 100 per cent cotton yarn.

This standard does not cover yarn produced from blends of cotton with man-made fibres or any other fibre.

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*

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

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

ISO 105-X12, *Textiles — Tests for colour fastness — Part X12: Colour fastness to rubbing*

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

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

ISO 1833-5, *Textiles — Quantitative chemical analysis — Part 5: Mixtures of viscose, cupro or modal and cotton fibres (method using sodium zincate)*

ISO 1833-11, *Textiles — Quantitative chemical analysis — Part 11: Mixtures of certain cellulose fibres with certain other fibres (method using sulfuric acid)*

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

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

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

ISO 2859-1, *Sampling procedures for inspection by attributes — Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

ISO 14184-1, *Textiles — Determination of formaldehyde — Part 1: Free and hydrolysed formaldehyde (water extraction method)*

ISO 14184-2, *Textiles — Determination of formaldehyde — Part 2: Released formaldehyde (vapour absorption method)*

ISO 14362-1, *Textiles — Test methods for determination of certain aromatic amines derived from azo colorants Part 1: Detection of the use of certain azo colorants accessible with or without extracting the fibres*

ISO 14362-3, *Textiles — Test methods for determination of certain aromatic amines derived from azo colorants Part 3: Detection of the use of certain colorants, which may release 4-amino azo benzene*

ISO 14389, *Textiles — Determination of the phthalate content — Tetrahydrofuran method*

ISO 16373-2, *Textiles — Dyestuffs — Part 2: General method for the determination of extractable dyestuffs including allergenic and carcinogenic dyestuffs (method using pyridine-water)*

ISO 16373-3, *Textiles — Dyestuffs — Part 3: Method for determination of certain carcinogenic dyestuffs (method using triethylamine/methanol)*

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

ISO 17202, *Textiles — Determination of twist in single spun yarns — Untwist/retwist method*

3 Terms and definitions

For the purposes of this East African Standard, the following terms and definitions shall apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1
breaking load
maximum load (or force) applied to a specimen in a tensile test carried to rupture

3.2
tex
number of grams per kilometre of yarn

3.3
ring spun
yarn spun on a system employing flat top cards and roller drafting assemblies with or without aprons on drawing, roving and ring frames

3.4
rotor spun
yarn spun on an open-end spinning machine wherein the individualization and assembling of fibres are done and the real twist is effected by a rotor

3.5
plied yarn
yarn in which two or more single yarns are twisted together in one or two operations

3.6
stitches
yarn coils that get laid outside the edge of the package (cross winding)

3.7
cotton yarn
type of yarn that is made from 100% cotton fibres

3.8
tenacity
tensile force per unit of linear density of the unstrained specimen

Note 1 to entry: It is preferably expressed in centinewtons per tex

3.9
breaking tenacity
tenacity corresponding to the breaking load

Note 1 to entry: For specimens of known linear density, the breaking tenacity can be obtained directly from tensile testing machines which can be suitably adjusted to indicate tenacity instead of breaking load

3.10
unevenness
variation of linear density along the length of a continuous strand of yarn

3.11
coefficient of variation of unevenness
value of unevenness expressed as coefficient of variation

3.12
yarn count
mass per unit length of a yarn

Note 1 to entry: It is preferably expressed in tex or multiples or sub multiples thereof See - ISO 1144.

4 Requirements

4.1 General requirements

4.1.1 The yarn packages shall be correctly and uniformly wound and shall enable the removal of yarn without difficulty and entanglement.

4.1.2 Single yarn used for producing doubled yarn shall comply with the requirements in 4.2.

4.1.3 Yarn on cones/cheeses shall be free from the following defects:

a) stitches of more than 2.5 cm in length at the base;

b) excessive stitches at the nose;

c) soft cones or cheeses;

d) prominent stains inclusive of chalk and other markings;

e) cut threads;

f) entanglement;

g) presence of hard waste;

h) ribbon formation;

i) drum cuts; and

j) count mix up.

4.2 Specific requirements

4.2.1 Yarn count

When tested in accordance with ISO 2060, the yarn count shall be as declared on the label marking subject to a tolerance of:

a) ±3.0 % on the yarn intended for machine knitting and machine weaving processes;

b) ±4.0 % on the yarn intended for handlooms;

c) ±2.0 % on plied yarn

NOTE Yarn count is expressed in different units such as tex and English count (Ne)

$$Tex = \frac{590.5}{Ne}$$

4.2.2 Yarn twist

4.2.2.1 The number of turns per metre shall be determined in accordance with ISO 2061 or ISO 17202. The percentage CV of twist shall be less than 10 % of the declared value on the label.

NOTE 1 TPM = 39.37 TPI

4.2.2.2 When determined in accordance with ISO 2061 and ISO 17202, the direction of twist shall be as declared by the manufacturer.

4.2.3 Moisture regain

Unless otherwise agreed to between the purchaser and the manufacturer, the moisture regain of cotton yarns shall not exceed 8.5 % when determined in accordance with Annex A.

4.2.4 Yarn appearance

When determined in accordance with ASTM D2255, the average black board appearance (five boards) shall be at least of Grade D. In case of yarn counts coarser than 98 tex (6s), this shall be as agreed to between the purchaser and the manufacturer.

4.2.5 Breaking tenacity

When tested in accordance with ISO 2062, cotton yarn shall meet the breaking tenacity requirements given in Table 1.

Table 1 — Breaking tenacity of cotton yarn

Yarn type	Breaking tenacity, cN/tex, min.
Combed ring spun yarn for weaving	15.0
Combed ring spun for knitting	14.0
Carded ring spun for weaving	13.5
Carded ring spun for knitting	13.0

Carded rotor spun for weaving	10.5
Carded rotor spun for knitting	9.0

4.2.6 Unevenness

When tested in accordance with ISO 16549, cotton yarn shall meet the unevenness requirements given in Table 2, Table 3 and Table 4.

Table 2 — Unevenness of carded ring spun cotton yarn

Linear density, tex	C.V. %, max.
Coarser than 60	11.5
60 - 35	12.5
34 - 25	13.5
24 - 20	14.5
19 - 16	15.0
15 – 13	15.5
Finer than 13	15.8

Table 3 — Unevenness of combed ring spun cotton yarn

Linear density, tex	C.V. %, max.
Coarser than 20	10.5
19 - 16	11.0
15 - 13	12.5
12 - 11	13.0
10 - 9	13.5
8 – 7.6	14.0
7 – 6.4	14.5
Finer than 6.4	15.0

Table 4 — Unevenness of carded rotor spun cotton yarn

Linear density, tex	C.V. %, max.
Coarser than 60	11.0
60 - 35	12.5
34 - 25	13.5
24 - 20	14.5
19 - 16	15.5
15 – 13	16.0

4.2.7 Fibre composition

The fibre composition shall be 100 % cotton fibres when tested in accordance with ISO 1833-5, ISO 1833-11 or any other relevant part of ISO 1833.

4.2.8 Yarn mass

The mass of the yarn shall be not less than 98 % of the declared value when tested in accordance with Annex B.

4.2.9 Colour fastness

The minimum colour fastness rating for dyed cotton yarns shall be as given in Table 5 when tested in accordance with the test methods specified therein.

Table 5 — Colour fastness requirements of cotton yarn

S/N	Parameter		Numerical rating, min.		Test method
			Colour change	Staining	
i	Light		5	-	ISO 105–B02
ii	Washing		3	3	ISO 105-C10
iii	Rubbing	Dry		3-4	ISO 105-X12
		Wet		3	

4.2.10 Restricted chemicals and substances

Dyed cotton yarn shall not contain:

a) Restricted aromatic amines exceeding 30 mg/kg when tested in accordance with ISO 14362-1 and ISO 14362-3.

b) Carcinogenic dyestuffs exceeding 20 mg/kg when tested in accordance with ISO 16373-2 and ISO 16373-3

c) phthalates exceeding 0.1% when tested in accordance with ISO 14389

d) formaldehydes exceeding 300 mg/kg when tested in accordance with ISO 14184-1 and ISO 14184-2

5 Packaging

Cotton shall be packaged in suitable packaging materials which shall protect the product from damage during transportation, handling and storage. Spools, cones or cheeses shall be packaged in unit packages and thereafter into bulk cases.

6 Labelling

6.1 Unit packages

Each unit package shall bear a clear and indelible label which shall include the following particulars:

a) manufacturer's name and address;

registered trade mark (if any);

b) product name as "100 % cotton yarn";

c) linear density in 'tex';

d) twist in turns per metre (TPM) and the direction of twist (S or Z);

e) number of plies (for plied yarn)

f) mass of yarn in gram;

g) intended use of yarn such as "weaving, knitting"

h) country of manufacture;

i) shade number (if coloured);

j) whether carded (KW) or combed (CW); and

k) batch/lot number.

6.2 Bulk package

Each bulk package shall bear the following information:

a) manufacturers name and address

b) trade mark;

c) product name, such as "100 % cotton yarn";

d) linear density in 'tex';

e) net mass in kilograms;

f) number of unit packages;

g) intended use of yarn such as "weaving, knitting";

h) country of manufacture; and

i) lot/batch number.

7 Sampling

Sampling shall be done in accordance with ISO 2859-1.

Annex A
(normative)

Determination of moisture regain

A.1 Principle

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

A.5 Report

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

Annex B
(normative)

Determination of net mass of the yarn

B.1 Principle

The mass of the yarn is taken using a weighing balance without considering the mass of the wrappers and holders (cone/spool)

B.2 Apparatus

Weighing balance, capable of determining the mass of yarn to an accuracy of ± 0.2 %

B.3 Procedure

B.3.1 Condition five specimens (yarns) without wrappers in accordance ISO 139.

B.3.2 Determine the mass of the conditioned specimens using the weighing balance (B.2).

B.3.3 Calculate the average of the mass obtained.

B.3.4 Report the average mass in grams.

Bibliography

[1] US 2260-1:2021, *Textiles — Cotton yarn — Part 1: Weaving*

[2] US 2260-2:2021, *Textiles — Cotton yarn — Part 2: Hosiery*

[3] KS 1113-1:1993, *Specification for spun yarns — Part 1: Cotton yarns*