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Textiles — Cotton yarn — Part 1: Weaving



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Foreword

Uganda National Bureau of Standards (UNBS) is a parastatal under the Ministry of Trade, Industry and Cooperatives established under Cap 327, of the Laws of Uganda, as amended. UNBS is mandated to coordinate the elaboration of standards and is

- (a) a member of International Organisation for Standardisation (ISO) and
- (b) a contact point for the WHO/FAO Codex Alimentarius Commission on Food Standards, and
- (c) the National Enquiry Point on TBT Agreement of the World Trade Organisation (WTO).

The work of preparing Uganda Standards is carried out through Technical Committees. A Technical Committee is established to deliberate on standards in a given field or area and consists of key stakeholders including government, academia, consumer groups, private sector and other interested parties.

Draft Uganda Standards adopted by the Technical Committee are widely circulated to stakeholders and the general public for comments. The committee reviews the comments before recommending the draft standards for approval and declaration as Uganda Standards by the National Standards Council.

The committee responsible for this document is Technical Committee UNBS/TC 7, Textiles, Leather, Paper and related products, Subcommittee SC 1, Textiles and related products.

WDUS 2260 consists of the following parts, under the general title *Textiles — Cotton yarn*

- — *Part 1: Weaving*
- — *Part 2: Hosiery*

Textiles — Cotton yarn — Part 1: Weaving

1 Scope

This Draft standard specifies requirements of spun (single and doubled) grey cotton yarn for use in weaving.

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

2 Normative references

The following referenced 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*

ASTM D5647, *Standard guide for measuring hairiness of yarns by the photo-electric apparatus*

ISO 2, *Textiles — Designation of the direction of twist in yarns and related products*

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

ISO 6939, *Textiles — Yarns from packages — Method of test for breaking strength of yarn by the skein method*

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

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

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

3 Terms and definitions

For the purposes of this document, the following terms and definitions 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
cotton count (Ne)**
number of hanks (each measuring 768 m or 840 yd) in 453.6 g (or 1 lb)
- 3.2
count lea strength product (CSP)**
product of the lea breaking load in pounds and cotton count
- 3.3
grey cotton yarn**
yarn as it leaves the spinning frame without any bleaching, dyeing or finishing treatment
- Note 1 to entry: The yarn may be waxed or unwaxed
- 3.4
hairiness index**
total length of protruding fibres in the yarn in cm with reference to the sensing length of 1 cm yarn
- 3.5
lea**
continuous length of yarn measuring 109.73 m (120 yd) in the form of a coil having 80 wraps wound on a reel of 1.37 m (1.5 yd) girth
- 3.6
breaking load**
maximum load (or force) applied to a specimen in a tensile test carried to rupture
- 3.7
single yarn tenacity**
tensile stress of a single strand at rupture expressed as force per unit linear density of the unstrained specimen expressed usually as cN/tex (gf/tex).
- 3.8
tex**
number of grams per kilometre of yarn
- 3.9
ring spun yarn**
yarn spun on a system employing flat top cards and roller drafting assemblies with or without aprons on drawing, roving and ring frames
- 3.10
rotor spun yarn**
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
- 3.11
virgin cotton**
consisting of more than 65 percent raw short staple cotton and the rest superior comber noil
- 3.12
waste cotton**
consisting of cotton from yellow pickings, blowroom droppings, flat strips and comber noil mixed in suitable proportions

Note 1 to entry: It may include short staple virgin cotton to the extent of 35 percent

3.13**doubled yarn**

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

4 Requirements**4.1 General****4.1.1 Yarn Count**

4.1.1.1 The average resultant count of yarn shall be as agreed between the purchaser and manufacturer.

4.1.1.2 A tolerance of ± 3.0 percent shall be permissible on the count of yarn intended for shuttles and auto looms

4.1.1.3 A tolerance of ± 4.0 percent shall be permissible on the count of yarn intended for handlooms

4.1.1.4 Yarn count shall be determined in accordance with US ISO 2060.

4.1.2 Yarn twist

4.1.2.1 The number of turns per unit length shall be determined in accordance with ISO 2061 or ISO 17202. The direction for twist shall be indicated by the capital letter "S" or "Z" as specified in ISO 2.

4.1.2.2 The average twist shall be within ± 10 percent and ± 5 percent of the specified value for single spun yarn and doubled yarn respectively

4.1.3 Moisture regain

Unless otherwise agreed to between the purchaser and manufacturer, the moisture regain shall not exceed 8.5 percent when determined in accordance with ISO 6741-1.

4.1.4 Yarn appearance

When determined in accordance with ASTM D2255, the average black board appearance (5 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.

4.1.5 Freedom from defects

The 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) absence of tail end where it is required and the length of the tail-end should not be less than 30 cm;
- g) entanglement;

- h) presence of hard waste;
- i) ribbon formation;
- j) drum cuts;
- k) count mix up.

4.2 Ring spun single yarn

4.2.1 The ring spun single grey cotton carded or combed yarn shall comply with the requirements given in Table 1 or Table 2 respectively.

4.2.2 When determined in accordance with ISO 6939, the coefficient of variation of lea breaking load shall not exceed 10.0 percent

Table 1 — Performance requirements of carded ring spun single yarn

Parameter	Requirements							Test Method
	≥ 59 tex (≤ 10s)	36.9 tex – 53.7 tex (10s – 16s)	29.5 tex – 34.7 tex (17s – 20s)	20.3 tex – 28.1 tex (21s – 29s)	15.1 tex – 19.7 tex (30s – 39s)	10.9 tex – 14.8 tex (40s – 54s)	10.9 tex (54s) and finer	
Count CV, %, Max.	2.00	2.20	2.20	2.20	2.20	2.20	2.50	US ISO 2060
CSP, Min.	2 000	2 100	2 200	2 200	2 300	2 400	2 400	Annex A
Yarn Tenacity cN/tex, Min.	13.5	14.0	14.5	15.0	15.5	16.5	17.0	ISO 2062
Yarn Tenacity CV, %, Max.	9.0	9.0	9.5	10.0	10.5	11.0	11.5	ISO 2062
Breaking elongation, %, Max.	5.2							ISO 2062
Unevenness, %, Max.	10.50	12.00	12.00	12.50	12.50	14.00	15.50	ISO 16549
Hairiness Index, Max.	7.0	6.5	6.0	5.5	5.2	4.8	4.5	ASTM D5647
Imperfections/Km.								ISO 16549
Thin	3	4	4	20	50	50	200	
Thick	100	120	140	200	300	400	700	
Neps	50	60	70	280	425	650	1 100	
Total	153	184	214	500	775	1 100	2 000	
NOTE The unevenness percentage (U %) and the imperfections per Km of the yarn on packages shall not exceed the values given in Table 1 when tested at a speed of 400 m/min and at sensitivity of -50%, +50% and +200% for thin places, thick places and neps respectively								

Table 2 — Performance requirements of combed ring spun single yarn

Parameter	Requirements								Test Method
	≥ 59 tex (≤ 10s)	36.9 – 53.7 tex (10s – 16s)	29.5 – 34.7 tex (17s – 20s)	20.3 – 28.1 tex (21s – 29s)	15.1 – 19.7 tex (30s – 39s)	10.9 – 14.8 tex (40s – 54s)	7.9 – 10.7 tex (55s – 66s)	7.8 tex (75s) and finer	

		16s)	20s)	29s)	39s)	54s)	74s)	finer	
Count CV, %, Max.	1.80	2.00	2.00	2.00	2.00	2.00	2.50	2.50	US ISO 2060
CSP, Min.	2 300	2 400	2 400	2 500	2 500	2 600	2 700	2 650	Annex A
Yarn Tenacity cN/tex, Min.	14.5	15.0	15.5	16.0	16.5	17.0	17.5	18.0	ISO 2062
Yarn Tenacity CV, %, Max.	8.5	8.5	8.5	9.0	9.0	10.0	10.0	10.0	ISO 2062
Breaking elongation, %, Max	5.0					4.7	4.5	4.3	ISO 2062
Unevenness, %, Max	8.50	9.00	9.00	10.00	11.00	12.50	13.00	14.00	ISO 16549
Hairiness Index	6.0	5.8	5.5	5.0	4.7	4.2	3.3	2.9	ASTM D5647
Imperfections/Km									
Thin	0	0	0	0	1	5	15	40	ISO 16549
Thick	5	8	10	18	26	45	80	140	
Neps	7	17	20	32	53	100	165	270	
Total	12	25	30	50	80	150	260	450	

NOTE The unevenness percentage (U %) and the imperfections per Km of the yarn on packages shall not exceed the values given in Table 2 when tested at a speed of 400 m/min and at sensitivity of -50%, +50% and +200% for thin places, thick places and neps respectively

4.3 Rotor spun single yarn

The rotor spun grey cotton yarn shall comply with the requirements given in Table 3 or Table 4

Table 3 — Performance requirements of rotor spun single yarn (Waste Cotton)

Parameter	Requirements					Test Method
	≥ 118 tex (≤ 5s)	59.0 – 98.4 tex (6s – 10s)	36.9 – 53.7 tex (11s – 16s)	29.5 – 34.7 tex (17s – 20s)	28.1 tex (21s)	
Count CV, %, Max.	2.00	2.20	2.20	2.50	2.50	US ISO 2060
CSP, Min.	1 600	1 500	1 500	1 400	1 400	Annex A
Lea Breaking Load CV, %, Max.	5.5	6.0	6.0	6.5	6.5	ISO 6939
Yarn Tenacity cN/tex, Min.	9.5	9.0	9.0	8.5	8.5	ISO 2062
Yarn Tenacity CV, %, Max.	11.0	11.0	11.0	11.5	11.5	ISO 2062
Unevenness, %, Max	12.00	12.50	13.00	14.00	14.00	ISO 16549
Imperfections/Km						ISO 16549
Thin	0	0	5	10	15	
Thick	90	150	175	200	225	
Neps	50	100	120	140	160	

Total	140	250	300	350	400	
NOTE The unevenness percentage (U %) and the imperfections per Km of the yarn on packages shall not exceed the values given in Table 3 when tested at a speed of 400 m/min and at sensitivity of -50%, +50% and +280% for thin places, thick places and neps respectively						

Table 4 — Performance requirements of rotor spun single yarn (Virgin Cotton)

Parameter	Requirements					Test Method
	≥ 118 tex (≤ 5s)	59.0 – 98.4 tex (6s – 10s)	36.9 – 53.7 tex (11s – 16s)	29.5 – 34.7 tex (17s – 20s)	28.1 tex (21s)	
Count CV, %, Max.	1.80	2.00	2.00	2.20	2.20	US ISO 2060
CSP, Min.	1 800	1 750	1 700	1 650	1 600	Annex A
Lea Breaking Load CV, %, Max.	5.0	5.5	5.5	6.0	6.0	ISO 6939
Yarn Tenacity cN/tex, Min.	10.5	10.0	10.0	9.5	9.5	ISO 2062
Yarn Tenacity CV, %, Max.	10.50	10.50	10.5	11.0	11.0	ISO 2062
Unevenness, %, Max	10.00	10.00	10.50	10.50	12.00	ISO 16549
Imperfections/Km						ISO 16549
Thin	0	2	5	10	15	
Thick	30	35	50	60	75	
Neps	15	28	40	60	85	
Total	45	65	95	130	175	
NOTE The unevenness percentage (U %) and the imperfections per Km of the yarn on packages shall not exceed the values given in Table 4 when tested at a speed of 400 m/min and at sensitivity of -50%, +50% and +280% for thin places, thick places and neps respectively						

4.4 Doubled yarn

4.4.1 The single yarn used for producing doubled yarn shall satisfy the requirements specified in 4.1 and either 4.2 or 4.3.

4.4.2 The count lea strength product (CSP) of doubled yarn shall not be less than the value calculated by the following relationship:

CSP of doubled yarn

= 1.10

× CSP of corresponding single fold yarn given in either Table 1, Table 2, Table 3 or Table 4

4.4.3 The coefficient of variation of the lea count shall not exceed 2.0 percent

4.4.4 The coefficient of variation of the lea breaking load shall not exceed 7.0 percent.

4.5 Yarn intended for handloom weaving

4.5.1 Yarn intended for use in handlooms shall conform to the requirements given from 4.1 to 4.4 with modifications given in 4.5.2, Table 5 and Table 6

4.5.2 The minimum yarn tenacity shall be 10.8 cN/tex and 12.5 cN/tex for carded and combed yarn respectively.

Table 5 — Performance requirements of carded yarns intended for handlooms

Parameter	Requirements						Test Method
	≥ 98 tex (≤ 6s)	37 – 98 tex (6s – 16s)	18.5 – 37 tex (16s – 32s)	12 – 18.5 tex (32s – 50s)	7.9 – 12 tex (50s – 75s)	7.9 tex (75s) and finer	
CSP, Min.	1 000	1 350	1 700	1 800	2 000	2 000	Annex A
Unevenness, %, Max.	17.5	16.5	15.5	16.5	17.5	17.5	ISO 16549
Imperfections/Km							ISO 16549
Thin	400	340	340	400	540	540	
Thick	750	600	540	950	775	775	
Neps	1 250	950	750	1 500	1 620	1 620	
Total	2 400	1 890	1 630	2 850	2 935	2 935	

NOTE The unevenness percentage (U %) and the imperfections per Km of the yarn on packages shall not exceed the values given in Table 4 when tested at a speed of 400 m/min and at sensitivity of -50%, +50% and +200% for thin places, thick places and neps respectively

Table 6 — Performance requirements of combed yarns intended for handlooms

Parameter	Requirement						Test Method
	≥ 98 tex (≤ 6s)	37 – 98 tex (6s – 16s)	18.5 – 37 tex (16s – 32s)	12 – 18.5 tex (32s – 50s)	7.9 – 12 tex (50s – 75s)	7.9 tex (75s) and finer	
CSP, Min.	-	-	2 000	2 050	2 150	2 250	Annex A
Unevenness, %, Max	14.5	14.5	14.5	13.5	14.5	14.5	ISO 16549
Imperfections/Km							ISO 16549
Thin			60	60	95	125	
Thick			375	315	315	375	
Neps			500	375	375	435	
Total			935	750	785	935	

NOTE The unevenness percentage (U %) and the imperfections per Km of the yarn on packages shall not exceed the values given in Table 4 when tested at a speed of 400 m/min and at sensitivity of -50%, +50% and +200% for thin places, thick places and neps respectively

5 Labelling

5.1 Each cone or cheese of yarn shall be marked with the following:

- product name as “100% cotton”;
- count of yarn in ‘Ne’ or ‘tex’;
- lot number;
- manufacturer’s name, trademark or other means of identification;

- e) spinning method used, e.g. ring or rotor;
- f) individual package size/mass;
- g) end use of yarn, e.g. weaving, knitting or handlooms weaving (Handloom yarns shall be further indicated as made from either 'VIRGIN' or 'WASTE' cotton);
- h) whether carded (KW) or combed (CW);
- i) whether waxed or unwaxed;
- j) packaging and storage conditions.
- k) Country of origin

5.2 Each case containing cones or cheeses shall be marked with the following:

- a) name of material;
- b) count of yarn in 'Ne' and/or 'tex;'
- c) lot number;
- d) manufacturer's name, trademark or other means of identification;
- e) gross mass of bale or case;
- f) net mass of bale or case;
- g) packaging and storage conditions.

6 Packaging

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

7 Sampling

7.1 In any consignment, the cases containing yarn of the same type and of the same nominal count shall constitute a lot.

7.2 Samples shall be drawn from each lot to determine its conformance with the requirements of the standard.

7.3 Unless otherwise agreed to between the buyer and the seller, the number of cases to be selected from a lot shall be in accordance with Table 7. The bales or cases shall be selected at random.

7.4 In case two or less cases are selected in the sample, at least 10 cones or cheeses shall be drawn at random from each of the selected case. However, in case three or more cases are selected in the sample, at least five cones or cheeses shall be drawn at random from each of the selected case.

Table 7 — Sampling

Lot Size	Sample Size
Up to 3	1
4 – 10	2
11 – 30	3
31 – 50	5
Over 50	8

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Annex A

(normative)

Calculation of count strength product (CSP)

CSP is obtained by the following relationship:

$$CSP = \text{Breaking load of a lea in Kg} \times 2.2046 \times \text{cotton count (Ne)}$$

Where;

The breaking load is determined in accordance with ISO 6939

Cotton count (Ne) is determined in accordance with US ISO 2060

Bibliography

- [1] IS 171:1993, *Textiles — Ring spun grey cotton yarn for weaving — Specification*
- [2] IS 13683:2006, *Textiles — Ring spun grey cotton yarn — Specification*
- [3] IS 13684:2006, *Textiles — Rotor spun grey cotton yarn — Specification*

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