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# SPECIFICATION FOR GREY COTTON YARN PART 2—HANDLOOM
## (FIRST REVISION)

BUREAU OF CEYLON STANDARDS

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SLS 137:Part 2:1981

Gr.7



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SRI LANKA STANDARD

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**FOREWORD**

This Sri Lanka Standard Specification was prepared by the Drafting Committee on Grey Cotton Yarns. It was approved by the Textiles Divisional Committee of the Bureau of Ceylon Standards and was authorized for adoption and publication by the Council of the Bureau on 1981-07-28.

This standard is based on CS 137 which is withdrawn on the date of publication of this standard.

CS 137 covered requirements of grey cotton yarn intended for use in handloom, powerloom and hosiery industries. In the present revision it is intended to give requirements in separate standards in order to have more comprehensive standards to suit the needs of each industry. A revised standard for powerloom yarn has already been prepared and is available as SLS 137 Part 1.

This standard gives requirements for grey cotton yarn intended for use in handlooms. The yarn strength index values have been revised and maximum linear irregularity values are specified only for counts finer than 13 tex. It is hoped to issue a separate standard for grey cotton yarn intended for use by the hosiery industry in due course.

All standard values given in this specification are in SI units. However, English cotton count equivalents for linear density in tex values are given in an appendix for guidance.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or observation shall be rounded off in accordance with CS 102. The number of figures to be retained in the rounded off value shall be the same as that of the specified value in this standard.

In the preparation of this standard assistance derived from publications of the Indian Standards Institution, American Society for Testing and Materials and Zellweger Uster Ltd., is gratefully acknowledged.

## 1 SCOPE

This specification covers the requirements of grey cotton yarns intended for use in handlooms.

## 2 REFERENCES

This standard makes reference to the following standards.

SLS 20 Method for determination of the size of yarns (First Revision)

SLS 23 Twist in yarns - Direct counting method (First Revision)

CS 102 Presentation of numerical values

SLS 428 Random sampling method

## 3 DEFINITIONS

For the purpose of this standard, the following definitions shall apply :

**3.1 nep (cotton yarn)** : A defect in a yarn characterized by a small knot of entangled fibres.

**3.2 skein** : A continuous length of yarn measuring 100 m in the form of a coil made on a 1 m girth reel.

**3.3 skein breaking load** : The breaking load of a skein determined by testing on a pendulum type testing machine the rate of traverse being 300 ± 15 mm/min.

**3.4 slub (bunch, slug)** : A defect in a yarn characterized by a segment not over 6 mm in length that shows an abrupt increase in diameter caused by more fibres matted in this particular place.

**3.5 snarl** : A short length of yarn which has twisted on itself due to lively twist.

**3.6 tex** : The mass in grams of 1 kilometre of yarn.

**3.7 thick place** : A defect in a yarn, extending for 6 mm or more characterized by a diameter greater than that of the adjoining segments; the unevenness is normally caused by a greater number of fibres per yarn cross-section than usual.

**3.8 thin place :** A defect in a yarn characterized by a segment that is substantially (at least 25 per cent) smaller in diameter than the average diameter of the yarn. A thin place may be of any length.

**3.9 unevenness-U per cent :** The mean deviation in mass/unit length of 8 mm increments of yarn determined by an electronic type unevenness tester.

**3.10 yarn appearance :** Visual effect obtained by viewing samples wound with a designated traverse on a black board of designated size.

**3.11 yarn strength index (YSI) :** The numerical value of the breaking load, in newtons of a 100 m skein divided by the linear density of yarn in tex, and the numerical value of the standard gravity *g*.

## 4 GENERAL REQUIREMENTS

**4.1** The yarn shall be reasonably clean, free from foreign matter and neps, snarls, slubs, thick and thin places. A list of common defects of yarn on cones and hanks is given in Appendix B.

## 5 SPECIFIC REQUIREMENTS

### 5.1 Composition

The yarn shall be 100 per cent cotton.

### 5.2 Appearance

In the case of single yarns the appearance of the yarn shall be graded in accordance with American Society for Testing and Materials (ASTM) grades (See ASTM D 2255 - Grading of cotton yarns for appearance).

*NOTE - ASTM grading of cotton yarn for appearance is done by comparing the sample wound on a black board with a series of standard photographic plates.*

### 5.3 Count of yarn

The yarn of various counts shall conform to the requirements specified in Table 1.

**5.3.1** A tolerance of ± 3 per cent on the sample average in the count of yarn shall however be permissible.

**5.3.2** The coefficient of variation shall not exceed 5 per cent.

**5.3.3** The count of yarn shall be determined by the method described in SLS 20.

**5.4 Yarn strength index (YSI)***

**5.4.1** The yarn strength index (YSI) of yarns shall be not less than the values prescribed in Table 1.

**5.4.2** Yarn strength index (YSI) shall be calculated by the following formula :

$$\text{Yarn strength index} = \frac{L}{gt} \times 1000$$

where

$L$ = Skein breaking load in newtons ;

$t$ = Universal count of yarn in tex ; and

$g$ = Numerical value of the standard gravity = 9.8066

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* *It has been found that for a given yarn, the yarn strength index and the count lea strength product (CSP) are numerically the same. Count lea strength product (CSP) shall be calculated by the following formula :*

$$\textit{Count lea strength product (CSP)} = L_1 \times C$$

*where*

$L_1$ = *Lea breaking load in lbs ; and*

$C$ = *Count of yarn in English cotton count.*

TABLE 1 - Particulars of grey cotton yarn for weaving (handloom)

(See 5.3, 5.4, 5.5 and Appendix A)

| No. | Count of yarn in tex | Carded or combed | Minimum YSI | | Maximum Twist/m* | |
|---|---|---|---|---|---|---|
| | | | Warp | Weft | Warp | Weft |
| 1 | 295 | Carded | 330 | 300 | 230 | 220 |
| 2 | 148 | " | 605 | 550 | 330 | 320 |
| 3 | 100 | " | 825 | 750 | 400 | 390 |
| 4 | 72 | " | 880 | 800 | 470 | 450 |
| 5 | 60 | Carded | 1,100 | 1,000 | 520 | 500 |
| 6 | 50 | " | 1,320 | 1,200 | 570 | 550 |
| 7 | 42 | " | 1,375 | 1,250 | 620 | 590 |
| 8 | 36 | " | 1,485 | 1,350 | 660 | 630 |
| 9 | 30 | Carded | 1,540 | 1,400 | 740 | 700 |
| 10 | 25 | " | 1,595 | 1,450 | 810 | 770 |
| 11 | 21 | " | 1,650 | 1,500 | 870 | 830 |
| 12 | 20 | " | 1,650 | 1,500 | 910 | 860 |
| 13 | 18 | Carded | 1,650 | 1,500 | 940 | 890 |
| 14 | 16 | " | 1,705 | 1,550 | 990 | 940 |
| 15 | 15 | " | 1,705 | 1,550 | 1050 | 1000 |
| 16 | 13 | " | 1,680 | 1,600 | 1100 | 1040 |
| 17 | 12 | Carded | 1,840 | 1,750 | 1170 | 1110 |
| 18 | 12 | Combed | 1,890 | 1,800 | 1170 | 1110 |
| 19 | 10 | " | 1,890 | 1,800 | 1280 | 1220 |
| 20 | 8.4 | " | 2,100 | 2,000 | 1380 | 1320 |
| 21 | 7.2 | Combed | 2,205 | 2,100 | 1480 | 1410 |
| 22 | 6.0 | " | 2,205 | 2,100 | 1650 | 1570 |
| 23 | 5.4 | " | 2,310 | 2,200 | 1730 | 1650 |
| 24 | 5.0 | " | 2,100 | 2,000 | 1810 | 1730 |
| 25 | 2 x 100 | Carded | 550 | 500 | 260 | 240 |
| 26 | 2 x 60 | " | 715 | 650 | 330 | 310 |
| 27 | 2 x 36 | " | 935 | 850 | 420 | 400 |
| 28 | 2 x 30 | " | 1,155 | 1,050 | 470 | 440 |
| 29 | 2 x 25 | Carded | 1,375 | 1,250 | 510 | 490 |
| 30 | 2 x 21 | " | 1,430 | 1,300 | 550 | 520 |
| 31 | 2 x 20 | " | 1,485 | 1,350 | 570 | 540 |
| 32 | 2 x 16 | " | 1,595 | 1,450 | 630 | 600 |
| 33 | 2 x 15 | Carded | 1,595 | 1,450 | 660 | 630 |
| 34 | 2 x 10 | Combed | 1,630 | 1,550 | 810 | 770 |
| 35 | 2 x 7.2 | " | 1,680 | 1,600 | 940 | 890 |
| 36 | 2 x 6.0 | " | 1,940 | 1,850 | 1050 | 990 |
| 37 | 2 x 5.0 | Combed | 1,940 | 1,850 | 1150 | 1090 |

* *Twist specified in case of doubled yarns is the resultant yarn twist.*

5.5 Twist per metre

5.5.1 Twist per metre of yarns shall not be more than the values prescribed in Table 1.

5.5.2 The twist per metre of yarns shall be determined by the method described in SLS 23.

5.6 Unevenness

5.6.1 For counts finer than 12 tex the maximum mean linear irregularity (U per cent) of cotton yarn shall be not more than the value prescribed in Table 2.

*NOTE - C.V. = 1.25 x U per cent*

*Where U per cent is the percentage of mean deviation of unevenness and C.V. is the percentage of coefficient of variation of unevenness.*

TABLE 2 - Mean linear irregularity of cotton yarn (handloom)

| No. | Count of yarn in tex | Carded or Combed | Maximum mean linear irregularity (U %) |
|---|---|---|---|
| 17 | 12 | Carded | 18.0 |
| 18 | 12 | Combed | 14.2 |
| 19 | 10 | " | 14.5 |
| 20 | 8.4 | " | 14.8 |
| 21 | 7.2 | " | 15.0 |
| 22 | 6.0 | " | 15.4 |
| 23 | 5.4 | " | 15.5 |
| 24 | 5.0 | " | 15.7 |
| 34 | 2 x 10 | " | 14.5 |
| 35 | 2 x 7.2 | " | 15.0 |
| 36 | 2 x 6.0 | " | 15.4 |
| 37 | 2 x 5.0 | " | 15.7 |

## 6 PACKAGING

### 6.1 Packaging of cones

All yarn for sale in cones shall be individually wrapped in polyethylene or similar material to avoid damage and these shall be packed in cartons, unless otherwise agreed on between the buyer and the seller, the net mass of a cone shall be 1.25 kg and these shall be packed in cartons having 36 cones per carton. An insert to prevent collapsing shall be inserted at the base of each cone.

### 6.2 Packaging of hanks

Yarn in hanks shall be made into bundles of 4.5 kg or 2.25 kg. The two sides shall be covered in kraft paper or equivalent and each bundle shall be tied at three places with cotton twine of suitable quality.

*NOTE - A hank will consist of 766 m of yarn.*

## 7 LABELLING AND MARKING

### 7.1 Labelling of cones

Each cone shall be labelled with the following information.

a) Count of yarn in tex ; and

b) Name of the manufacturer.

### 7.2 Labelling of cartons

Each carton shall be labelled with the following information.

a) Count of yarn in tex ;

b) Name of the manufacturer ;

c) Type of yarn (warp or weft) ;

d) Direction of twist (S or Z) ;

e) Number of cones in carton;

f) Gross mass in kilograms ; and

g) Net mass in kilograms.

### 7.3 Labelling of bundles

Each bundle of yarn shall be labelled on two opposite sides with the following information :

a) Type of yarn (warp or weft) ;

b) Count of yarn in tex;

c) Name of the manufacturer ;

d) Net mass in kilograms ; and

e) Direction of twist (S or Z).

*NOTE - Net mass is oven dried mass x 8.5 per cent moisture regain.*

## 8 SAMPLING

### 8.1 Scale of sampling

#### 8.1.1 *Lot*

All the bales or cases of cotton yarn of the same count manufactured at one time and relatively uniform conditions of production, delivered to one buyer against one despatch note shall constitute a lot.

**8.1.2** Samples shall be tested from each lot for ascertaining the conformity of the yarn to the requirements of this specification.

**8.1.3** The number of bales or cases to be selected from a lot shall depend on the size of the lot, and shall be in accordance with Table 3.

TABLE 3 - Number of bales or cases to be selected

| Lot size | No. of bales or cases to be selected |
|---|---|
| Up to 8 | 3 |
| 9 to 15 | 4 |
| 16 to 25 | 5 |
| 26 to 50 | 7 |
| 51 to 100 | 8 |
| 101 to 150 | 9 |
| 151 to 300 | 10 |
| 301 and above | 12 |

**8.1.4** From each bale or case selected as above five bundles or packages shall be selected.

**8.1.5** Bales or cases and bundles or packages shall be drawn at random. To ensure randomness of selection random number tables as given in SLS 428 shall be used.

### 8.2 Test specimen

From each bundle or package selected as above one test specimen shall be selected (discarding at least first 50 m from the package) to represent the bundle or package.

### 8.3 Number of tests and length of the test specimen

**8.3.1** Tests for each of the requirements given in **5** shall be conducted on each of the test specimens.

**8.3.2** The length of the test specimen to test for requirements given in **5.1**, **5.2**, **5.3**, **5.4** and **5.5** shall be in accordance with Table 4.

**TABLE 4 - Length of test specimen**

| Count | Length in metres |
|---|---|
| 5 tex and above | 100 |
| below 5 tex | 200 |

**8.3.3** The length required for the test prescribed in **5.6** shall be in accordance with the length specified in the tester.

## 9 CRITERIA FOR CONFORMITY

The lot shall be considered to be in conformity with the requirements of the specification if the number of test specimens selected to represent the bundles or packages not conforming to any one or more requirements of this specification, is less than or equal to the corresponding acceptance number given in Column 2 of Table 5.

**TABLE 5 - Criteria for conformity**

| No. of test specimens tested | Acceptance no. |
|---|---|
| 15 | 1 |
| 20 | 1 |
| 25 | 1 |
| 35 | 2 |
| 40 | 2 |
| 45 | 3 |
| 50 | 3 |
| 60 | 4 |

## APPENDIX A

Traditional English cotton count values and their rounded tex value equivalents.

| Traditional English cotton count | | Rounded tex value |
|---|---|---|
| 1 | 2 S | 300 |
| 2 | 4 S | 145 |
| 3 | 6 S | 100 |
| 4 | 8 S | 74 |
| 5 | 10 S | 59 |
| 6 | 12 S | 50 |
| 7 | 14 S | 42 |
| 8 | 16 S | 37 |
| 9 | 20 S | 30 |
| 10 | 24 S | 25 |
| 11 | 28 S | 21 |
| 12 | 30 S | 20 |
| 13 | 32 S | 18.5 |
| 14 | 36 S | 16.5 |
| 15 | 40 S | 14.5 |
| 16 | 44 S | 13.5 |
| 17 | 50 S | 12 |
| 18 | 60 S | 10 |
| 19 | 70 S | 8.5 |
| 20 | 80 S | 7.4 |
| 21 | 100 S | 5.9 |
| 22 | 110 S | 5.3 |
| 23 | 120 S | 5 |

## APPENDIX B

(4.1)

### COMMON DEFECTS OF YARN ON CONES AND HANKS

**B.1 Common defects of yarn on cones**

a) Stitches of more than 25 mm in length at the base ;

b) Excessive stitches at the nose ;

c) Soft cones ;

d) Collapsed cones ;

e) Prominent stains inclusive of chalk and other markings ;

f) Cut threads ; and

g) Absence of tail-end where it is required (the length of the tail-end should not be less than 300 mm).

**B.2 Common defects of yarn in hanks**

a) Improper leasing ;

b) Nose and tail-end not tied with tie yarn ;

c) Entanglement ;

d) Presence of many knots with long tail-ends ;

e) Presence of hard waste ;

f) Excessive presence of twistlessness, irregular twist or cork screw effects in case of plied yarns ; and

g) Plying of wrong counts.

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