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SPECIFICATION FOR COIR YARN

BUREAU OF CEYLON STANDARDS

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SLS 513:1981

Gr. 8

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This Standard does not purport to include all the necessary provisions of a contract.

SRI LANKA STANDARD
SPECIFICATION FOR COIR YARN

FOREWORD

This Sri Lanka Standard was authorized for adoption and publication by the Council of the Bureau of Ceylon Standards on 1981-04-10 after the draft, finalized by the Drafting Committee on Coir Fibre, had been approved by the Agricultural and Food Products Divisional Committee.

The Coconut Development Authority would maintain a standard set of coir yarn samples for the purpose of comparing the colour of yarns.

The standard values for characteristics other than fineness or coarseness of coir yarn are specified in SI units. The fineness or coarseness of coir yarn has been specified in terms of *scorage values* in accordance with current trade practices.

This specification includes requirements for scorage, runnage, twist, breaking strength, colour and packaging, which are subject to agreement between the buyer and the seller.

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

In the preparation of this specification the assistance obtained from related publications of the International Organization for Standardization and the Indian Standards Institution is gratefully acknowledged.

1 SCOPE

This specification prescribes the requirements and methods of test and sampling for coir yarn.

2 REFERENCES

CS 19 Designation of the structure of yarns

CS 102 Presentation of numerical values

SLS 428 Random sampling methods

3 DEFINITIONS

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

3.1 **breaking strength** : The maximum force which the yarn is able to support during the tensile breaking test, expressed in kilograms.

3.2 **runnage** : The length per unit mass generally expressed in metres per kilogram.

3.3 **scorage** : A number indicating the fineness or coarseness of coir yarn which is obtained by dividing by 20 the number of strands that could be laid very close to each other without overlapping in a length of one metre.

3.4 **twist** : The twist of a yarn is characterised by the direction of twist, described as S or Z (see CS 19) and by the number of turns per metre of the yarn.

4 GRADES

Coir yarn may be graded in accordance with its scorage, runnage, twist, breaking strength and colour.

5 REQUIREMENTS

5.1 Scorage, runnage, twist and breaking strength of coir yarn shall be in accordance with the values agreed to between the buyer and the seller and shall be determined by the methods specified in Appendices B, C, D and E respectively.

5.2 Colour

Each grade of coir yarn shall be supplied in any of its natural colours as agreed to between the buyer and the seller. For the purpose of comparing the colour, a sample sealed by mutual agreement may be used. These samples shall not be exposed to direct light.

5.3 Salt content

The salt content of yarn of different grades (i.e. total chlorides expressed as sodium chloride) when determined by the method specified in Appendix F, shall not exceed 5.5 per cent by mass of conditioned yarn.

5.4 Moisture content

The moisture content of yarn of different grades when determined by the method specified in Appendix G shall not exceed 18.0 per cent by mass when determined in ambient atmosphere.

5.5 Sand content

The sand content of yarn of different grades when determined by the method specified in H.1 shall not exceed 2.0 per cent by mass.

NOTE - An easier method for determining sand content is specified in H.2. *This method is likely however, to give higher test results than method* H.1. *In the event therefore that the test results exceed 2.0 per cent when determined by method* H.2, *then the test should be repeated according to method* H.1.

6 PACKAGING

Coir yarn shall be packed in bales or as agreed to between the buyer and the seller.

7 MARKING

Each bale or package shall be marked with the following particulars;

a) Name and address of the seller and/or registered trade mark, if any;

b) The words "Coir Yarn";

c) Net mass, in kilograms;

d) The words "Product of Sri Lanka"; and

e) Any other information required by the buyer or by the law in force.

8 SAMPLING

The method of drawing representative samples of the material shall be as specified Appendix A.

9 METHODS OF TEST

9.1 Tests shall be carried out as specified in Appendices B, C, D, E, F, G and H.

9.2 Quality of reagents

Unless specified otherwise, chemicals of analytical grade and distilled water shall be employed in tests.

10 CRITERIA FOR CONFORMITY

A lot shall be considered to be in conformity with the requirements of this specification if the following conditions are satisfied;

a) The colour of the hanks constituting the test specimens (see **A.2.1**) matches with the colour of the sample sealed by mutual agreement between the buyer and the seller.

b) The separate averages of all the test results for scorage, runnage, twist and breaking strength obtained on testing the specimen samples (see **A.2.2**) are in accordance with the respective values specified by the buyer and the seller.

c) From the results of testing the characteristics specified in **5.3**, **5.4** and **5.5**, the mean ($\bar{X}$) and the range (R) shall be calculated separately for each requirement and the value of the expression ($\bar{X}$ + 0.4R) for each requirement is less than or equal to the corresponding specified value.

APPENDIX A

SAMPLING

A.1 SCALE OF SAMPLING

A.1.1 In any consignment all the bales or packages of coir yarn of the same grade delivered to one buyer against one despatch note shall be grouped to constitute a lot.

A.1.2 Samples from each lot shall be tested for ascertaining the conformity of the yarn to the requirements of this specification.

A.1.3 The number of bales or packages to be selected from a lot shall depend on the size of the lot, and shall be in accordance with Table 1.

TABLE 1 - Scale of sampling

No. of bales/packages in the lot	No. of bales/packages to be selected
Up to 50	03
51 to 100	04
101 to 150	05
151 to 300	07
301 to 500	10
501 to 1000	15
1001 and above	20

A.1.4 These bales or packages shall be selected at random, and to ensure randomness of selection, a random number table as given in SLS 428 shall be used.

A.2 TEST SAMPLES AND TEST SPECIMENS

A.2.1 For determining the colour, one hank shall be drawn at random from each of the selected bales or packages to form the test sample. For the purpose of colour (see **5.2**), all hanks in the test sample shall constitute the test specimens.

A.2.2 For determining scorage, runnage, twist and breaking strength, three hanks shall be drawn at random from each of the bales or packages selected to form the test sample. For determining each characteristic, three pieces of coir yarn drawn at random from each hank in the test sample shall constitute the test specimens.

A.2.3 For determining the salt content, moisture content and sand content of yarn, one hank shall be drawn at random from each bale or package selected to form the test sample. One piece of coir yarn drawn at random from each hank in the test sample shall constitute the test specimens. The test specimens for moisture content shall be weighed immediately after sampling to avoid any change in mass due to absorption or desorption of moisture due to atmospheric conditions. If it is not possible to weigh immediately, they shall be packed in polythene bags or any other air-tight containers soon after sampling.

APPENDIX B

DETERMINATION OF SCORAGE

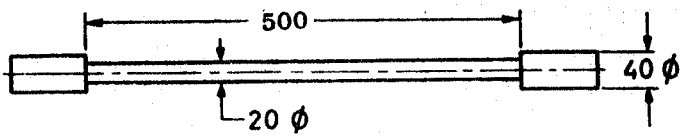
(See **5.1** and **A.2.2**)

B.1 TEST SPECIMENS

For the purpose of this test, pieces of yarn approximately 10 m in length, drawn from the test sample as in **A.2.2** shall constitute the test specimens.

B.2 APPARATUS

For the purpose of this test, a wooden dumb-bell shaped device as given in Fig. 1 may be used.



(All dimensions in millimetres)

FIGURE 1 - Apparatus for the determination of scorage

B.3 PROCEDURE

B.3.1 Take a test specimen (see A.2.2), wind it under enough tension to prevent kinking but without stretching, on the central portion of the device (see Fig. 1) so that the successive wrappings of the yarn are in close contact but without overlapping. Count the total number of such wrappings.

B.3.2 Calculate the scorage of the test specimen using the formula given below:

$$\text{Scorage of yarn} = \frac{\text{Total number of wrappings counted}}{10}$$

B.3.3 Determine similarly the scorage of the remaining test specimens and calculate the average of all the observations.

APPENDIX C

DETERMINATION OF RUNNAGE

(See 5.1 and A.2.2)

C.1 TEST SPECIMENS

For the purpose of this test, pieces of yarn approximately 1 metre in length, drawn from the test sample as in A.2.2 shall constitute the test specimens.

C.2 PROCEDURE

C.2.1 Lay out by hand on a flat surface, a test specimen and measure its length to the nearest millimetre.

C.2.2 Determine the mass of the test specimen to the nearest milligram.

C.2.3 Calculate the runnage as follows:

$$\text{Runnage of yarn in m/kg} = \frac{l}{m}$$

where

l = length in metres, of the test specimen, and

m = mass in kilograms, of the test specimen.

C.2.4 Determine similarly the runnage of the remaining test specimens and calculate the average of all the observations.

APPENDIX D

DETERMINATION OF TWIST

(See **5.1** and **A.2.2**)

D.1 TEST SPECIMENS

For the purpose of this test, pieces of yarn approximately 1 metre in length, drawn from the test sample as in **A.2.2** shall constitute the test specimens.

D.2 PROCEDURE

D.2.1 Lay out by hand on a flat surface, a test specimen and measure its length to the nearest millimetre.

D.2.2 Note the direction of twist and count the number of turns in the test specimen.

D.2.3 Calculate the twist as follows:

$$\text{Twist, in number of turns per metre} = \frac{n}{l}$$

where

n = number of turns in the test specimen, and

l = length, in metres, of the test specimen.

D.2.4 Determine similarly the twist in the remaining test specimens and calculate the average of all observations.

APPENDIX E

DETERMINATION OF BREAKING STRENGTH

(See 5.1 and A.2.2)

E.1 TEST SPECIMENS

For the purpose of this test, pieces of yarn of a length sufficient for carrying out the test described in **E.3**, drawn from the test sample as in **A.2.2** shall constitute the test specimens.

E.2 APPARATUS

E.2.1 *Tensile testing machine*, a constant rate of traverse type machine of appropriate capacity, the rate of traverse of the moving element of which is 300 ± 15 mm per minute. Roller type jaws shall preferably be used.

E.3 PROCEDURE

Mount a test specimen without loss of twist on the strength testing machine keeping the distance between the clamps equal to 300 mm. Start the machine and carry out the test until breakage occurs. Note the breaking strength of the specimen correct to the nearest 0.5 kg.

NOTE - The test shall take into account only the actual breaks which occur clear of the grips of the machine. Should breakage occur within 10 mm of either grip at less than the specified breaking strength, the specimen shall be discarded and another specimen tested.

APPENDIX F

DETERMINATION OF SALT CONTENT

(See 5.3 and A.2.3)

F.1 TEST SPECIMENS

For the purpose of this test, test specimens each weighing approximately 5 grams shall be drawn from the test sample as in **A.2.3.**

F.2 CONDITIONING OF TEST SPECIMENS

Prior to evaluation, the test specimens shall be conditioned for 48 hours in a standard atmosphere at 65 ± 5 per cent relative humidity and 27 ± 2 °C temperature.

F.3 PROCEDURE

F.3.1 Immediately after conditioning (see **F.2**), weigh to the nearest milligram one test specimen. Boil it in 200 ml of distilled water

for 30 minutes. Decant the extract into a beaker and re-extract the test specimen twice, each time boiling with 100 ml of distilled water for 15 minutes, and decanting the extract into the same beaker (see Note). Filter the extract so decanted, allow it to cool to room temperature and make up the volume to 500 ml with distilled water. Transfer 25 ml of the extract to a conical flask and add 5 millilitres of 6N nitric acid. Add to this a measured excess of 0.05N silver nitrate solution from a burette. Add also 5 millilitres of nitrobenzene and 1 millilitre of ferric alum indicator and shake the mixture vigorously to coagulate the precipitate. Titrate the mixture against a standard solution of potassium thiocyanate. Take the end point to have been reached when the aqueous solution turns red and does not fade after five minutes.

NOTE - In case sodium chloride is not completely extracted, it may be necessary to repeat the boiling of the test specimens with more water. To test for the complete extraction of sodium chloride the usual procedure is to wash the test specimen with about 30 ml of hot distilled water and to about 5 ml of the washings, so obtained, a few drops of silver nitrate solution is added. If the washings show any turbidity, the presence of sodium chloride in the test specimen due to incomplete extraction is indicated.

F.3.1.1 Make a blank determination with all the reagents but taking distilled water instead of the extract.

F.3.2 Calculate the percentage of sodium chloride using the following formula:

$$\text{Sodium chloride, per cent by mass} = \frac{N \times (V_1 - V_2)\ 20 \times 5.846}{m}$$

where

N = normality of the potassium thiocyanate solution;

V_1 = volume, in millilitres, of the potassium thiocyanate solution required for blank titration (see **F.3.1.1**);

V_2 = volume, in millilitres, of the potassium thiocyanate solution required for the titration (see **F.3.1**); and

m = mass, in grams of conditioned test specimen.

F.3.3 Determine similarly the percentage of sodium chloride in the remaining test specimens.

F.3.4 Calculate the average and range of all the observations.

APPENDIX G

DETERMINATION OF MOISTURE CONTENT

(See 5.4 and A.2.3)

G.1 TEST SPECIMENS

For the purpose of this test, test specimens each weighing about 100 g shall be drawn from the test sample as in A.2.3.

G.2 APPARATUS

G.2.1 *Conditioning oven,* with forced ventilation, provided with positive valve control and capable of maintaining a temperature of 100 °C to 110 °C, equipped with a weighing balance arranged to weigh coir yarn with an accuracy of 0.5 gram while suspended within the drying chamber, the holder of the yarn to be of such a type as to ensure free access of dry air to all portions of the yarn.

G.3 PROCEDURE

G.3.1 Weigh the test specimen to the nearest 0.5 gram (see Note). Place it in the conditioning oven, dry at a temperature of 100 °C to 110 °C for 1 hour and weigh again. Repeat the process of heating and weighing until the difference in mass between two successive weighings does not exceed 0.5 gram.

NOTE - Usually, soon after sampling, the test specimens are weighed accurately and the procedure in G.3.1, *carried out. If however, this is not done, the specimens are sealed in air tight containers soon after sampling (see* A.2.3); *for determining the moisture content, these test specimens are taken out and weighed accurately, and the procedure under* G.3.1 *carried out.*

G.3.2 Calculate the percentage of moisture content using the following formula:

$$\text{Moisture content, per cent by mass} = \frac{(m_1 - m_2)}{m_1} \times 100$$

where

m_1 = mass, in grams, of the original test specimen; and

m_2 = mass, in grams, of the oven dry test specimen.

G.3.3 Determine similarly the percentage moisture content of the remaining specimens.

G.3.4 Calculate the average and range of all the observations.

APPENDIX H

DETERMINATION OF SAND CONTENT

(see 5.5 and A.2.3)

H.1 METHOD 1

H.1.1 Test specimens

For the purpose of this test, two sets, of test specimens, each specimen weighing about 50 grams in one set and about 5 grams in the other set, shall be drawn from the test sample as given in **A.2.3.**

H.1.2 Conditioning of test specimens

Prior to evaluation, the test specimens shall be conditioned for 48 hours in a standard atmosphere at 65 ± 5 per cent relative humidity and 27 ± 2 °C temperature.

H.1.3 Procedure

H.1.3.1 Immediately after conditioning (see **H.1.2**), weigh one of the larger test specimens (weighing approximately 50 g) to the nearest 0.1 gram. Burn it in a porcelain dish to ash. Transfer the ash to a tared platinum crucible and heat in a muffle furnace at 550 °C to 600 °C for 8 hours. Cool in a desiccator and weigh. Repeat the process of heating, cooling and weighing until the difference in mass between two successive weighings is less than one milligram.

H.1.3.2 Remove all sand and other impurities adhering to the smaller test specimen (weighing approximately 5 grams), condition, and weigh the cleaned specimen to the nearest 0.1 gram. Ash the specimen as described in **H.1.3.1** and weigh to the nearest one milligram.

H.1.3.3 Calculate the sand content using the following formula:

$$\text{Sand content, per cent by mass} = \left[\frac{m_3}{m_1} - \frac{m_4}{m_2}\right] \times 100$$

where

m_1 = mass, in grams, of specimen with sand;

m_2 = mass, in grams, of sand free specimen;

m_3 = mass, in grams, of coir ash from specimen with sand; and

m_4 = mass, in grams, of coir ash from sand free specimen.

H.1.3.4 Determine similarly the percentage sand content of the remaining test specimens.

H.1.3.5 Calculate the average and range of all the observations.

H.2 METHOD 2

H.2.1 Test specimen

For the purpose of this test, test specimens, each weighing about 50 grams shall be drawn from the test sample as given in A.2.3.

H.2.2 Conditioning of test specimens

Condition the test specimens as prescribed in H.1.2.

H.2.3 Procedure

H.2.3.1 Immediately after conditioning (see H.2.2) weigh one test specimen to the nearest 0.1 gram. Unwind this sample over a suitable trough containing water. Wash the sample thoroughly in the water. Decant pieces of pith and other light impurities and collect the sand particles at the bottom of the trough. Wash the sand on to a tared filter paper using a wash bottle if necessary. Dry the filter paper containing sand in an oven capable of maintaining a temperature of 105 ± 5 °C for 1 hour. Cool the filter paper and contents in a desiccator and weigh. Repeat this process of heating, cooling and weighing until the difference in mass between two successive weighings is less than one milligram.

H.2.3.2 Calculate the sand content using the following formula:

$$\text{Sand content, per cent by mass} = \frac{m_2}{m_1} \times 100$$

where

m_2 = mass, in grams, of sand; and

m_1 = mass, in grams, of conditioned test specimen.

H.2.3.3 Determine similarly the percentage sand content of the remaining test specimens.

H.2.3.4 Calculate the average and range of all the observations.

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