SRI LANKA STANDARD 903 : 1990

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SPECIFICATION FOR

NYLON 6 YARN

SRI LANKA STANDARDS INSTITUTION

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SLS 903:1990

Gr. 6

SRI LANKA STANDARDS INSTITUTION
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Sri Lanka.

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Sri Lanka Standards are subject to periodical revision in order to accommodate the progress made by industry. Suggestions for improvement will be recorded and brought to the notice of the Committees to which the revision are entrusted.

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

SRI LANKA STANDARD
SPECIFICATION FOR NYLON 6 YARN

FOREWORD

This Sri lanka Standard was authorized for adoption and publication by the Council of the Sri Lanka Standards Institution on 1990-12-12, after the draft, finalized by the Drafting Committee on Nylon Yarn, had been approved by the Textiles Divisional Committee.

In this specification, a suitable method for determination of commercial mass is given in Appendix A as a guidance to the interested parties.

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 an analysis, shall be rounded off in accordance with CS 102. The number of significant places retained in the rounded off value shall be the same as that of the specified value in this specification.

In the preparation of this specification, the valuable assistance derived from the publications of the Bureau of Indian Standards and the Standards Institution of Israel is gratefully acknowledged.

1 SCOPE

1.1 This specification prescribes the requirements and methods of sampling and test for continuous filament, flat (non-textured) nylon 6 yarn generally used in the textile industry.

1.2 It does not cover nylon 6 yarn intended for special purposes such as fishing nets, woven reinforcement for tyres, ropes, sewing thread, etc.The textured yarn is also outside the scope of this specification.

2 REFERENCES

CS 17 Determination of moisture in textile materials and of correct invoice weight.
SLS 20 Determination of the size of yarns (First revision).
CS 22 Determination of breaking strength and extension of single strands.
SLS 25 Removal of non-fibrous matter prior to quantitative analysis of fibre mixtures (Second revision).
CS 102 Presentation of numerical values.
SLS 428 Random sampling methods.
SLS 674 Determination of short-term irregularity of linear density of textile slivers, rovings and yarns.

3 TYPES

This specification covers the following types of nylon 6 yarn;

a) Monofilament yarn ; and
b) Multifilament yarn.

4 REQUIREMENTS

4.1 General requirements

4.1.1 The yarn shall be free from knots.

4.1.2 The surfaces of the packages shall be free from visible broken filaments.

4.1.3 In all packages, tail-ends of at least 500 mm shall be provided.

4.2 Other requirements

4.2.1 *Mass*

The average net mass of a package shall be not less than the nominal net mass (see Note) when tested by the method prescribed in 9.2. The co-efficient of variation for net mass of packages shall be not more than 1.2 per cent.

NOTE

The nominal net mass of a package shall be calculated based on the net mass and number of packages declared on the carton.

4.2.2 *Linear density, tenacity, elongation at break and oil content*

The above characteristics of nylon 6 yarn shall comply with the requirements given in Table 1 when tested by the methods prescribed in Column 4 of the table.

TABLE 1 - Requirements for nylon 6 yarn

Sl. No. (1)	Characteristic (2)	Requirement (3)	Method of test (4)
i)	Tolerance for linear density (see Note 1)		Method A (in the conditioned state) of SLS 20
	a) for monofilaments	± 3.5 per cent of the nominal linear density	
	b) for multifilaments	± 3.0 per cent of the nominal linear density	
ii)	Co-efficient of variation for linear density, max.	4	SLS 20
iii)	Tenacity, mN/dtex, min.	40	CS 22 (see Note 2)
iv)	Elongation at break, per cent	42 ± 5	CS 22
v)	Oil content, per cent by mass, max.	1.5	Method A.1 of SLS 25

NOTES

1. The linear densities of nylon 6 yarn that are commonly used in this country at present are as follows :

a) 22 dtex f 1;
b) 44 dtex f 10 ;
c) 55 dtex f 40 ;
d) 77 dtex f 24 ; and
e) 110 dtex f 24

(To cover the value in "denier" to "dtex" it should be multiplied by 1.1).

2. Tenacity should be calculated as follows :

$$\text{Tenacity, mN/dtex} = \frac{\text{mean breaking strength, in millinewtons}}{\text{mean linear density, in dtex}}$$

4.2.3 *Unevenness*

The mean linear irregularity of yarn (U%) shall be not more than 1.5 per cent when tested by the method prescribed in SLS 674.

5 DEFECTS IN PACKAGES

The following shall be considered as defects in packages:

a) Soft packages;
b) Hard packages;
c) Collapsed packages;
d) Prominent stains inclusive of oil and other markings;
e) Bobbins/pirns with damaged tips causing difficulties in unwinding;
f) Broken filaments; and
g) Absence of tail-ends.

6 PACKAGING

The packages shall be properly wound and individually wrapped in polyethylene or any other suitable material.These packages shall be packed in suitable cartons as agreed to between purchaser and the supplier. All cartons shall have horizontal separators to prevent any damage to packages.

7 MARKING

7.1 Each package shall be legibly and indelibly marked or labelled with the following information :

a) Name of the product;
b) Linear density of yarn and number of filaments; and
c) Name and address of the manufacturer (including the country of origin).

7.2 Each carton shall be legibly and indelibly marked or labelled with the following information :

a) Name of the product;
b) Linear density of yarn and number of filaments;
c) Extent of dullness/brightness of yarn;
d) Name and address of the manufacturer (including the country of origin);
e) Number of packages;
f) Gross mass, in kilograms;
g) Net mass, in kilograms; and
h) Batch or code number.

NOTE

Attention is drawn to the certification facilities offered by the Sri Lanka Standards Institution. See the inside back cover of this specification.

8 SAMPLING

8.1 Lot

In any consignment all the packages of nylon 6 yarn of the same linear density and belonging to one batch of manufacture or supply shall constitute a lot.

8.2 Scale of sampling

8.2.1 The samples shall be tested from each lot for ascertaining its conformity to the requirements of this specification.

8.2.2 The number of packages to be selected from a lot shall be in accordance with Table 2.

TABLE 2 - Scale of sampling

Number of packages in the lot (1)	Number of packages to be selected (2)	Acceptance number for defective packages (3)
Up to 300	5	1
301 to 500	8	2
501 to 1 000	13	3
1 001 to 3 000	16	3
3 001 and above	20	4

8.2.3 The packages shall be selected from cartons. For this purpose 10 per cent of the cartons subject to a minimum of 3 shall be drawn. As far as possible an equal number of packages shall be drawn from each selected carton to obtain the sample size given in Table 2.

8.2.4 The cartons and packages shall be selected at random. In order to ensure randomness of selection tables of random numbers as given in SLS 428 shall be used.

8.3 Number of tests

8.3.1 Each carton selected as in 8.2.3 shall be inspected for packaging (6) and marking requirements (7.2).

NOTES

1. *This may be done at the place of sampling.*
2. *The net mass and the number of packages indicated on the cartons should be noted down.*

8.3.2 Each package selected as in 8.2.2 and 8.2.3 shall be inspected for packaging (6) and marking requirements (7.1).

8.3.3 Each package selected as in 8.2.2 and 8.2.3 shall be inspected for defects in packages (5).

8.3.4 Each package selected as in 8.2.3 shall be tested for the requirements given in 4.2.1, 4.2.2 and 4.2.3.

NOTES

1. *It is necessary to discard at least 50 m from each package before taking test specimens.*
2. *For each requirement , the required test specimens shall be obtained in accordance with the relevant test methods.*
3. *Tests for the requirements 4.2.2 and 4.2.3 should be carried out first. The discarded lengths (see Note 1) and the test specimens used for the tests should be reserved for determination of mass of packages.*

9 METHODS OF TEST

9.1 Tests for the requirements prescribed in 4.2 shall be carried out by the methods given therein.

9.2 Determination of net mass of a package

9.2.1 Determine, to the nearest 1 g, the gross mass of packages in the sample, individually. Remove yarn from two packages and weigh, to the nearest 1 g, the mass of the two pirns .

9.2.2 Calculate the net mass of a pirn. Based on this value calculate individually, the net masses of packages and the average net mass of a package.

10 CRITERIA FOR CONFORMITY

A lot shall be declared as conforming to the requirements of this specification if the following conditions are satisfied :

10.1 Each carton inspected as in 8.3.1 satisfies the packaging and marking requirements.

10.2 Each package inspected as in 8.3.2 satisfies the packaging and marking requirements.

10.3 The number of defective packages when inspected as in 8.3.3 does not exceed the corresponding acceptance number given in Column 3 of Table 2.

10.4 When tested as in 8.3.4, the average value and the co-efficient of variation calculated using the test results on mass and linear density satisfy the relevant requirements.

10.5 When tested as in 8.3.4, the value of the expression $\bar{X} - 0.8\ s$ (see Notes) calculated using the test results on tenacity is not less than the specified value.

NOTES

(1) Mean $(\bar{x})$ = *The sum of values of observations devided by the number of observations.*

(2) Standard deviation (s) = *The positive square root of the quotient obtained by dividing the sum of squares of the deviations of the observations from their mean by one less than the number of observations.*

10.6 When tested as in 8.3.4, the values of the expressions, $\bar{X} + 0.8\ s$ and $\bar{X} - 0.8\ s$ calculated using the test results on elongation at break lie within the specified values.

10.7 When tested as in 8.3.4, the values of the expression $\bar{X} + 0.8\ s$ calculated using the test results on oil content and unevenness are not more than the specified values.

APPENDIX A
DETERMINATION OF COMMERCIAL MASS

Carry out the determination of commercial mass according to the method prescribed in CS 17. Use one of the following methods, whichever relevant, for cleaning yarn, prior to determination of mass. For calculation of commercial mass, the value of the commercial allowance should be taken as 5.75.

A.1 Procedures for cleaning

A.1.1 *For unsized yarn*

Immerse the sample in a soap solution at 70 °C to 75 °C, containing 5 g of soap (see Note 1) per one litre of soft water (see Note 2). The soap solution should weigh approximately 25 times the mass of the sample. After about 30 minutes add soft water heated to about 70 °C until 25 per cent of the solution overflows. Remove the sample and rinse it twice in soft water at about 85 °C rinsing each time for 5 minutes and centrifuging the sample after every rinse.

NOTES

1. *A typical composition of neutral soap is given below:*
   a) Oleic acid - 650 ml;
   b) Sodium hydroxide (24 per cent) - 350 ml; and
   c) Water to make upto 5 litres.
2. *The hardness of water should be not greater than 5 mg/kg expressed as calcium carbonate.*

A.1.2 *For water insoluble size*

Take a soap solution containing 10 g of soap per one litre of soft water (hardness as given in Note 2 under A.1.1 and pH of 9.5 to 10) equal to approximately 40 times the mass of the sample. Adjust pH by addition of sodium hydroxide or sulfuric acid solution. Raise the temperature of the solution to about 30 °C; immerse the sample and allow to cool to room temperature. Keep for at least 12 hours. Raise the temperature to 85 ± 2 °C in 30 minutes and maintain it for 2 hours with constant stirring. Remove the sample and rinse it twice in soft water at about 85 °C rinsing each time for 15 minutes and centrifuging the sample after every rinse. Finally rinse the sample in distilled water at about 40 °C and centrifuge.

A.1.3 *For water soluble size*

Heat soft water, equal to approximately 40 times the mass of the sample to 50 °C. Place the sample and allow it to stand for 12 hours, maintaing the temperature at about 40 °C. Transfer the sample to a soap solution at 85 °C, containing 5 g of soap per one litre of soft water and agitate for an hour. Remove the sample and rinse it twice in soft water at about 85 °C rinsing each time for 15 minutes and centrifuging the sample after every rinse. Finally rinse the sample in distilled water and centrifuge.

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SRI LANKA STANDARDS INSTITUTION

The Sri Lanka Standards Institution (SLSI) is the National Standards Organization of Sri Lanka established under the Sri Lanka Standards Institution Act No. 6 of 1984 which repealed and replaced the Bureau of Ceylon Standards Act No. 38 of 1964. The Institution functions under the Ministry of Science & Technology.

The principal objects of the Institution as set out in the Act are to prepare standards and promote their adoption, to provide facilities for examination and testing of products, to operate a Certification Marks Scheme, to certify the quality of products meant for local consumption or exports and to promote standardization and quality control by educational, consultancy and research activity.

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The development and formulation of National Standards is carried out by Technical Experts and representatives of other interest groups, assisted by the permanent officers of the Institution. These Technical Committees are appointed under the purview of the Sectoral Committees which in turn are appointed by the Council. The Sectoral Committees give the final Technical approval for the Draft National Standards prior to the approval by the Council of the SLSI.

All members of the Technical and Sectoral Committees render their services in an honorary capacity. In this process the Institution endeavours to ensure adequate representation of all view points.

In the International field the Institution represents Sri Lanka in the International Organization for Standardization (ISO), and participates in such fields of standardization as are of special interest to Sri Lanka.

Printed at the Sri Lanka Standards Institution, 17, Victoria Place, Elvitigala Mawatha, Colombo 08.

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