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Indian Standard

TEXTILES — ACRYLIC YARN FOR HOSIERY — SPECIFICATION

ICS 59.080.20; 61.020
FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Man-Made Fibres, Cotton and Their Products Sectional Committee had been approved by the Textiles Division Council.

Acrylic yarn is being extensively used in the manufacture of hosiery goods. It is produced in a variety of design and colours as non-bulky or bulky yarn. In order to safeguard consumer interest, it is essential to standardize the quality of acrylic yarn for hosiery based on performance characteristics.

The composition of the Committee responsible for the formulation of this standard is given in Annex C.

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 analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (revised)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.
Indian Standard

TEXTILES — ACRYLIC YARN FOR HOSIERY — SPECIFICATION

1 SCOPE

This standard prescribes the quality requirements for non-bulky and bulky acrylic yarn used in the manufacture of hosiery goods.

2 REFERENCES

The Indian Standards listed in Annex A contain provisions which throw reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated in Annex A.

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 1324 and as given below shall apply.

3.1 Acrylic Shrinkable Fibre

When acrylic fibre is stretched under heat and cooled whilst under tension, it attains lateral shrinkage of the order of 16 to 22 percent. Such fibres are known as acrylic shrinkable fibres.

When these (shrinkable) fibres are subjected to heat accompanying water under specific condition, in free state show effective contraction.

Conventional bulky acrylic yarn is made by mix spinning of fibre having low shrinkage or no shrinkage and fibre having high shrinkage in definite proportion.

Such spun yarn, if heat treated by water or by steam, becomes bulky because fibre of no shrinkage bulges outward, with fibre of high shrinkage as core.

3.2 Bulky Yarn

Spun yarns made from staple fibres having a high degree of resilience in which the apparent density is much lower than the real density.

4 COMPOSITION OF ACRYLIC YARN

The acrylic yarn shall be spun from acrylic staple fibres as bulky or non-bulky yarn. The identification of the fibre shall be done as per the tests prescribed in IS 667. The yarn may be grey or dyed.

5 REQUIREMENTS

The acrylic yarn shall meet the requirements given in Table 1.

6 MARKING

6.1 Each cone of yarn shall be marked with the following:

a) Count of yarn followed by the word ‘Acrylic yarns for hosiery’;

b) Type of yarn, that is, non-bulky yarns or bulky yarns;

c) Net mass of yarn in package;

d) Indication of the source of manufacture;

e) Batch No. or month and year of manufacture; and

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

6.2 Each bale or case containing cones shall be marked with the following:

a) Count of yarn followed by the word ‘Acrylic yarns for hosiery’;

b) Net mass of yarn in bulk packing;

c) Gross mass of yarn in bulk packing;

d) Indication of the source of the manufacture;

e) Batch No. or month and year of manufacture; and

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

6.3 BIS Certification Marking

Each cone and the bulk packing may also be marked with the Standard Mark.

6.3.1 The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the license for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

7 PACKING

Unless otherwise agreed, the yarn shall be packed in accordance with the procedure laid down in either IS 2194 or IS 2195.

8 SAMPLING

8.1 Lot

In any consignment the bales or cases containing yarn of the same type and of the same nominal count shall constitute a lot.
Table 1 Requirements of Acrylic Yarn for Hosiery
( Clause 5 )

<table>
<thead>
<tr>
<th>Sl No.</th>
<th>Characteristics</th>
<th>Requirements</th>
<th>Method of Test, Ref to</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Non Bulky</td>
<td>Bulky</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Grey</td>
<td>Dyed</td>
</tr>
<tr>
<td>(1)</td>
<td>Count CV percent</td>
<td>4.0</td>
<td>4.0</td>
</tr>
<tr>
<td></td>
<td>Single yarn tenacity, gf/m</td>
<td>20.0</td>
<td>17.0</td>
</tr>
<tr>
<td></td>
<td>CV of single yarn tenacity percent</td>
<td>15.0</td>
<td>15.0</td>
</tr>
<tr>
<td></td>
<td>U, percent</td>
<td>14.0</td>
<td>14.0</td>
</tr>
<tr>
<td></td>
<td>Thin, per 1 000 m</td>
<td>90</td>
<td>95</td>
</tr>
<tr>
<td></td>
<td>Thick, per 1 000 m</td>
<td>155</td>
<td>180</td>
</tr>
<tr>
<td></td>
<td>Nepses, per 1 000 m</td>
<td>160</td>
<td>195</td>
</tr>
<tr>
<td></td>
<td>Imperfections, per 1000 m</td>
<td>395</td>
<td>470</td>
</tr>
<tr>
<td></td>
<td>Shrinkage, percent</td>
<td>2.5 ± 1</td>
<td>2.5 ± 1</td>
</tr>
<tr>
<td></td>
<td>Colour fastness:</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>1) Light</td>
<td>—</td>
<td>5 or better</td>
</tr>
<tr>
<td></td>
<td>2) Washing</td>
<td>—</td>
<td>4 or better</td>
</tr>
</tbody>
</table>

NOTES
1 The unevenness values are only for single ply yarn and it can be expressed as coefficient of variation of unevenness using the formula CV percent = 1.25 x U percent.
2 The speed and sensitivity levels of user may be as given below, subject to agreement between the buyer and the seller:
   a) Speed : 400 ml/Min
   b) Thick : + 50 percent
   c) Thin : - 50 percent
   d) Nep : + 200 percent
3 Tenacity values are the minimum required and other values specified are the maximum.
4 Bulky yarns may consist of minimum 30 percent shrinkable fibres.

Table 2 Sampling
( Clause 8.3 )

<table>
<thead>
<tr>
<th>Sl No.</th>
<th>Lot Size</th>
<th>Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>i)</td>
<td>Up to 3</td>
<td>1</td>
</tr>
<tr>
<td>ii)</td>
<td>4 to 10</td>
<td>2</td>
</tr>
<tr>
<td>iii)</td>
<td>11 to 30</td>
<td>3</td>
</tr>
<tr>
<td>iv)</td>
<td>31 to 50</td>
<td>5</td>
</tr>
<tr>
<td>v)</td>
<td>Over 50</td>
<td>8</td>
</tr>
</tbody>
</table>

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

8.3 Unless otherwise agreed to between the buyer and the seller the number of cases or bales to be selected from a lot shall be in accordance with Table 2. The bales or cases shall be selected at random and in order to ensure the randomness of selection, guidance may be obtained from IS 4905.

8.4 In case two or less bales or cases are selected in the sample at least five cones shall be drawn at random from each of the selected bale or case. The number of leas to be prepared from each cone shall not be greater than 6. As far as possible, equal number of leas shall be prepared from each of the selected cone. The number of leas so prepared from the lot shall be equal to 30.

8.4.1 In case single yarn tenacity is determined, the number of tests shall not be less than 50.

8.5 Criteria for Conformity
The lot shall be considered as conforming to the requirements of this standard, if the following conditions are satisfied:

a) Coefficient of variation for the count is less than the specified values;

b) Tenacity, is greater than or equal to the minimum specified values, and the coefficient of variation is less than the specified values; and

c) All the test specimens examined for, unevenness, shrinkage in boiling water, and colour fastness shall satisfy the relevant requirements.
ANNEX A
(Clause 2)

LIST OF REFERRED INDIAN STANDARDS

<table>
<thead>
<tr>
<th>IS No.</th>
<th>Title</th>
<th>IS No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1315:1977</td>
<td>Method for determination of linear density of yarn spun on cotton system (first revision)</td>
<td>2454:1985</td>
<td>Methods for determination of colour fastness of textile materials to artificial light (xenon lamp) (first revision)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7703:1987</td>
<td>Methods of test continuous filament polyester and polyamide flat yarn: Part 5 Unevenness percentage</td>
</tr>
</tbody>
</table>

ANNEX B

[Table 1, Sl No. (ix), Col 8]

DETERMINATION OF SHRINKAGE OF ACRYLIC YARNS FOR HOSIERY

B-1 PRINCIPLE

This test method covers the determination of shrinkage of yarns in skein form when immersed in boiling water. All measurements are made when the yarn is at standard conditions.

B-2 APPARATUS

  a) Skein reel 1.37 m circumference,
  b) Lacing string,
  c) Metre ruler mounted vertically with '0' mark at the top and hook to hold the yarn at '0' mark,
  d) Woven mesh bags of nylon or polyester, and
  e) Vessel for boiling skeins.

B-3 PROCEDURE

Make all skein length measurements in the standard atmosphere for testing textiles maintained at a relative humidity of 65 ± 2 percent and temperature of 27 ± 2°C (see IS 6359):

  a) Reel 109.7 meter (120 yard). Yarn (80 revolutions).
  b) Lace loosely in three places.
  c) Hang the skein over the hook on the vertical meter ruler.
  d) Attach the proper weight (see Table 3), based on yarn count, to the lower end of the skein.
  e) After the skein has hung with attached weight for 30 s, measure the length of the skein with weight attached. Record this value as 'original skein length' 'say A'.
  f) Twist the skein once into a shape of eight (8) and fold over, twist and fold again to give a four coil loop about 2½″ in diameter. Place the skein in a mesh bag.
  g) Boil at 100°C for 30 min in water containing 2 percent non-ionic detergent.
h) Cool to 50°C by overflow rinsing with cold water.

j) Centrifuge skeins lightly or squeeze out excess water by hand.

k) Remove skeins from mesh bag and air dry, or use hot air at a temperature below 100°C.

m) Then recondition each dried skein in the standard atmosphere for testing textiles (see IS 6359).

n) Measure skein length using the same weight used to determine original length. Record as length after boil-off “say B”.

p) Calculate boil-off shrinkage to nearest 0.1 percent as follows:

\[
\text{Shrinkage, percent} = \frac{A - B}{A} \times 100
\]

Table 3 Count Range — Single Yarn

[Clause B-3 (d)]

<table>
<thead>
<tr>
<th>Sl No.</th>
<th>Metric Count</th>
<th>English Count</th>
<th>Weight kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>i)</td>
<td>Up to 17</td>
<td>Up to 10</td>
<td>1.600</td>
</tr>
<tr>
<td>ii)</td>
<td>17 to 34</td>
<td>10 to 20</td>
<td>1.130</td>
</tr>
<tr>
<td>iii)</td>
<td>34 to 51</td>
<td>20 to 30</td>
<td>0.680</td>
</tr>
<tr>
<td>iv)</td>
<td>51 to 68</td>
<td>30 to 40</td>
<td>0.510</td>
</tr>
<tr>
<td>v)</td>
<td>68 to 102</td>
<td>40 to 60</td>
<td>0.340</td>
</tr>
<tr>
<td>vi)</td>
<td>102 to 136</td>
<td>60 to 80</td>
<td>0.230</td>
</tr>
</tbody>
</table>
ANNEX C
( Foreword )

COMMITTEE COMPOSITION

Man-Made Fibres, Cotton and Their Products Sectional Committee, TX 31

Organization

The Arvind Mills Ltd, Ahmedabad
Ashima Ltd, Ahmedabad
Central Institute for Research in Cotton Technology, Mumbai
Century Textiles and Industries Ltd, Mumbai
Consumer Guidance Society of India, Mumbai
Directorate General of Supplies and Disposals ( Inspection Wing ), New Delhi
Gwalior Rayon, Gwalior
Indian Cotton Mills’ Federation, New Delhi
Indian Institute of Technology, Delhi
Ministry of Defence ( DGQA ), New Delhi
Ministry of Defence ( R & D ), New Delhi
Morarjee Gokuldas Spinning and Weaving Mills Ltd, Mumbai
Office of the Textile Commissioner, Mumbai
Reliance Industries Ltd, Ahmedabad
Synthetic and Art Silk Mills Association, Mumbai
Textiles Committee, Mumbai
The Ahmedabad Textile Industry, Association Research Association, Ahmedabad
The Bombay Textile Research Association, Mumbai
The Rajasthan Spinning and Weaving Mills Ltd, Kharigram ( Bhilwara )
The Southern India Mills’ Association, Coimbatore
The Synthetic and Art Silk Mills Research Association, Mumbai
Vardhaman Spinning and General Mills Ltd, Ludhiana
Veermata Jijabai Technological Institute ( VJTI ), Mumbai
BIS Directorate General

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Shri K. Selvaraju ( Alternate )
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Shri V. K. Goyal
Dr A. R. Khare
Shri S. P. Burkar ( Alternate )
Shri P. Bhatnagar, Director & Head ( TXD )
[ Representing Director General ( Ex-officio ) ]

Member Secretary
Shri Arun Singh
Joint Director ( TXD ), BIS
Bureau of Indian Standards

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<table>
<thead>
<tr>
<th>Amend No.</th>
<th>Date of Issue</th>
<th>Text Affected</th>
</tr>
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