

---

---

वस्त्रादि — विस्कोस स्टेपल रेशे — विशिष्टि

**Textiles — Viscose Staple Fibres —  
Specification**

ICS 59.080.20

© BIS 2019



भारतीय मानक ब्यूरो  
BUREAU OF INDIAN STANDARDS  
मानक भवन, 9 बहादुरशाह ज़फर मार्ग, नई दिल्ली – 110002  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI-110002  
[www.bis.gov.in](http://www.bis.gov.in) [www.standardsbis.in](http://www.standardsbis.in)

## FOREWORD

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

Viscose Staple Fibre (VSF) is a man-made cellulosic fibre. Its properties are quite similar to cotton. The VSF is regenerated cellulose fibre and derived from dissolving grade pulp. The VSF or Viscose Rayon was the first generation of artificial cellulosic fibres. It is also known as art silk (abbreviated from 'artificial silk') in the textile industry. It usually has a high lustre quality giving it a bright shine.

Modal is a second generation regenerated cellulosic fibre and a variation of rayon. Modal's distinguishing characteristics are its high wet strength and its extra softness. Lyocell is the third generation of regenerated cellulosic fibre and a variation of rayon. Lyocell's advantages include its environmental friendliness of the chemical processing combined with its softness, drape, resistance to growth of bacteria which create odours, and other properties.

The composition of the Committee responsible for the preparation of this standard is given in Annex D.

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.

FOR BIS INTERNAL USE. NOT TO BE  
USED FOR STANDARDS  
DEVELOPMENT PURPOSE ONLY

## Indian Standard

# TEXTILES — VISCOSE STAPLE FIBRES — SPECIFICATION

### 1 SCOPE

This standard specifies requirements for all types of virgin viscose staple fibres (VSF) including modal and lyocell for various end usages.

### 2 REFERENCES

The standards listed in Annex A contain provisions, which through 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 TERMS AND DEFINITIONS

For the purpose of this standard, the following definitions in addition to those specified in IS 1324 shall apply.

**3.1 Oil Pickup Unit** — Retained finish by fibre.

**3.2 Abnormal Fibre and Other Matters** — The contents in viscose staple fibres, such as, hard chips, stuck filaments and hard viscose.

### 4 REQUIREMENTS

**4.1** The viscose staple fibres shall be identified by the method prescribed in IS 667 : 1981.

**4.2** The viscose staple fibre shall meet the physical and chemical requirements as specified in Table 1.

#### 4.3 Freedom from Defects

The viscose fibre shall be free from the following major defects:

##### 4.3.1 Dirt/Grease

No soiling or grease spots shall be allowed. It is acceptable if the spots can be cleaned off. Air strip fibre and tow to remove dirt on the outside surface. For dirt on the ends, clean with sprayer. If dirt does not come off, reject to off grade.

**Table 1 Requirements of Viscose Staple Fibres**

( Clause 4.2 )

SI No.	Characteristic	Viscose				Requirement	Method of Test
		Grey	Spun Shades	Modal	Lyocell		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	
i)	Denier (1.2), <i>Max</i>	1.23	—	1.23	1.23	IS 234	
	Denier (1.3), <i>Max</i>	—	1.40	—	—		
	Denier (1.5), <i>Max</i>	1.54	1.60	—	1.54		
ii)	Conditional tenacity, <i>gpd Min</i>	2.71	2.46	3.56	3.75	IS 235	
iii)	Whiteness (berger), percent, <i>Min</i>	78.0	N.A.	78.0 78.0	IS 1060 (Part 4/Sec 4)		
iv)	Length, mm	Declared	Declared	Declared	Declared	IS 4807	
		-1/+2	-1/+2	-1/+2	-1/+2		
vi)	Spinning faults, (> 19 mm) <i>Max</i>	2	2	2	2 Visual		
vi)	Shirley faults, mg/kg, <i>Max</i>	45	69	69	200	IS 4871	
vii)	Moisture, percent	9.0 - 13.0	8.0 - 13.0	9.0 - 13.0	9.0 - 13.0	Annex C	
viii)	Oil pickup, percent	Declared	Declared	Declared	Declared Annex B		
		± 0.04	± 0.04	± 0.04	± 0.04		
ix)	pH	6.5-7.5	6.5-7.5	6.5-7.5	6.5-7.5	IS 1390	

**4.3.2 Damaged/Bumped Fibres**

None allowed. Strip to correct or reject.

**4.3.3 Finish Oil Contamination**

Dry or regular oil fibre/tow shall not be contaminated with finish oil when viewed under a packing table UV light, unless very slight (not immediately visible). Strip to clean if possible. Otherwise reject to off-grade.

**4.3.4 Texture Colour/Appearance**

No overly shiny or dull fibre shall be allowed.

**4.3.5 Fluorescent Oil**

If applicable, the package shall have even coverage under UV light.

**4.3.6 Slubs/Loops/Kinks**

None shall be allowed.

**4.3.7** Other foreign materials like metals, plastic, dirt, dust, hair, fused fibres etc. shall not be allowed.

**4.4 Additional Requirements for ECO-Mark (Optional)**

For Ecomark, the product shall also comply with the additional requirements as given in Table 2.

**4.5 Commercial Mass**

The manufacturer shall declare the commercial mass of each consignment of VSF. The net mass of consignment at the standard moisture regain of 13 percent shall not be less than the commercial mass declared when tested by the methods prescribed in IS 6741 (Part 1, 2 and 3).

**5 PACKING**

The viscose staple fibres shall be packed in the form of bales of up to 400 kg each covered by PE/PP woven fabric stitched at sides, top and bottom and tightened by Polyester tapes (*see* IS 10415) such that the contents are safe from weather, dirt, dust and water, etc.

NOTE — The packing fabric/bag may be recycled in order to minimise environmental impact.

**6 MARKING**

**6.1** Each bale of viscose staple fibres shall be marked with an indelible ink the following information:

- a) Complete description of viscose by:
  - 1) Identification and classification;
  - 2) Net mass of each package, that is, bale with Sl. No.;
  - 3) Lot/batch No.; and
- b) Any other information required by the law in force.

**6.2** Instructions for transportation, handling and storage of viscose staple fibres shall also be provided by the manufacturer along with each consignment for proper care.

**6.3 BIS Certification Marking**

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations framed thereunder, and the product(s) may be marked with the Standard Mark.

**Table 2 Additional Requirements for ECO-Mark (Optional)**  
( Clause 4.4 )

SI No.		Characteristic	Requirement	Method of Test
(1)	(2)		(3)	(4)
i)	Free and releasable formaldehyde, mg/kg (ppm), <i>Max</i>		20	IS 14563 (Part I)
ii)	Extractable artificial sweat/saliva, heavy metals, mercury, ppm, <i>Max</i>		0.1	Annex A of IS 15651
iii)	Chromium III, ppm, <i>Max</i>		0.1	- do -
iv)	Chromium VI, ppm, <i>Max</i>		Nil	- do -
v)	Sum parameters (as lead), ppm, <i>Max</i>		10.0	- do -
vi)	Pentachlorophenol, ppm, <i>Max</i>		0.5	Annex B of IS 1565
vii)	Volatile hydrocarbons, ppm, <i>Max</i> (Non-halogens)		150	*
viii)	Volatile halogenated organics, ppm, <i>Max</i>		200	*
ix)	Pesticides (sum parameter)		1.0	Annex B of IS 15651:
x)	Banned pesticides		0	Annex B of IS 15651
xi)	Coupled amines released from azo dyes (sum parameters)		50	IS 17570

\* The manufacturer shall declare conformance taking into consideration the chemicals, auxiliaries and dyes used.

## 7 SAMPLING AND CRITERIA FOR CONFORMITY

### 7.1 Lot

The number of bales of viscose staple fibres of the same type, classification and identification delivered to a buyer against one dispatch note shall constitute a lot.

#### 7.1.1 Principle

The main object of this procedure is to prepare and ensure the best average sample for test which will represent the product for various quality tests.

#### 7.1.2 Preparation of Test Tuft - Denier and Tensile Tests

From the sample available for testing, pick up a handful of sample. Hold the sample using both hands and break open the sample by moving hands away from each other. Join both ends and hold the sample in left hand. Using thumb and forefinger pullout one tuft from the open surface and keep it on the table. Rotate sample in hand and repeat steps 'b' to 'd'. Repeat steps 'a' to 'e' till the whole sample is exhausted. Combine all the tufts to form a sub sample. Blend the sub sample by hand, and using both hands break open the sample as described in step 'b'. Join both the ends and hold it in left hand. Using thumb and fore finger, pull out tufts by repeated drawing to get a specified weight. During the test remove uncut and bunches.

#### 7.1.3 Preparation of Homogeneous Sample

Take 100 to 150 g fibre sample from a bale. Divide the sample in to eight parts and keep on a surface. Break open each part by holding with both hands and the outer fibres about 5g are taken out and discard the left over fibre sample. Take specimen from two parts of the test sample. The fibres thus obtained from sample part 2 is kept on that obtained from part 1 and break open the sample and take out the outer fibres taking care that

the fibre is not stretched. Thus, one sample is obtained from part 1 and 2. The doubling and dividing process is repeated for part 3 and 4, 5 and 6, 7 and 8, to get four samples out of eight. By repeating the same doubling and dividing procedure two samples are obtained from these four samples. Finally, one sample is obtained from the last two samples by the same procedure which is taken for analysis of tensile properties

**7.2** The number of bales of VSF to be selected at random from a lot shall be according to column 3 of Table 3. From each bale approximately one kg of fibre shall be selected at random from the top, bottom and middle portions to constitute the sample size. To ensure the randomness of selection, the sample shall be selected slightly below top and slightly above bottom of bale at different locations and all the samples so selected shall be mixed thoroughly to constitute the composite sample.

### 7.3 Number of Tests and Criteria for Conformity

**7.3.1** The number of bales to be selected from the lot shall be as per column 2 of Table 3. The number of test specimens each weighing approximately 25 g, to be selected from the composite sample for manufacturing defects and all other requirements shall be in accordance with column 5 of Table 3. To ensure the randomness of selection, IS 4905 may be followed.

**7.3.2** All the test specimens selected from the lot shall be tested for various requirements as specified in this standard. A test specimen shall be declared non-conforming if it does not meet any of the requirements specified in this standard. The lot shall be declared conforming to the requirements of this standard if the total number of defective bales does not exceed the acceptance numbers given in respective columns of Table 3.

**Table 3 Number of Bales to be Selected**

( Clauses 7.2, 7.3.1 and 7.3.2 )

Sl No.	Lot Size	Non-destructive Testing		Destructive Testing	
		No. of Bales to be Selected	Acceptance Number	No. of Bales to be Selected	Acceptance Number
(1)	$N$ (2)	$n$ (3)	$a$ (4)	$n_1$ (5)	$a_1$ (6)
i)	Up to 280	13 <sup>1)</sup>	1	8	0
ii)	281 - 500	20	2	8	0
iii)	501 - 1 200	32	3	13	0
iv)	1 201 - 3 200	50	5	13	0
v)	3 201 - 10 000	80	7	20	1

<sup>1)</sup> or lot size when less than 13.

## ANNEX A

( Clause 2.1 )

## LIST OF REFERRED INDIAN STANDARDS

<i>IS No</i>	<i>Title</i>	<i>IS No</i>	<i>Title</i>
234 : 2013	Textile — Methods for determination of linear density of textile fibres gravimetric and vibroscope method	4905 : 1968 6359 : 1971	Methods for random sampling Method for conditioning of textiles
235 : 1989	Textile fibres — Tensile characteristics of individual fibres — Methods for determination	6741 (Part 1) : 1989	Textiles — Fibres and yarns — Determination of commercial mass of Consignments: Part 1 Mass determination and calculations
667 : 1981	Methods for identification of textile fibres (With supplement)	(Part 2) : 1987	Part 2 Methods for obtaining laboratory samples
1060 (Part 4/ Sec 4) : 2014	Methods for sampling and test for paper and allied products: Part 4 Methods for test for paper, board and pulp, Section 4 Measurement of diffuse radiance factor	(Part 3) : 1987	Part 3 Specimen cleaning procedures
1390 : 2019/ ISO 3071 : 2005	Textiles — Determination of pH of aqueous extract ( <i>second revision</i> )	14563 (Part 1) : 1998	Textiles — Determination of formaldehyde: Part 1 Free formaldehyde
4807 : 1968	Methods of testing viscose rayon staple fibres	15651 : 2006	Textiles — Requirements for environmental labelling — Specification
4871 : 1968	Method for determination of lint and trash content of cotton by means of mechanical-pneumatic machines	15570 : 2005	Textiles — Method of test — Detection of banned azo colourants in coloured textiles

## ANNEX B

( Table 1 )

## METHODS FOR DETERMINATION OF FINISH OIL PICK UP

**B-1 PRINCIPLE**

The specimen is extracted with petroleum ether or methanol in Soxhlet apparatus and then distilled. The specimen is then dried and oil pick up is calculated from the mass of original specimen and the dried specimen.

**B-2 APPARATUS****B-2.1 Precision Balance****B-2.2 Stainless Steel Vessels****B-2.3 Conical Flasks****B-2.4 Bowls****B-2.5 Forceps****B-3 PROCEDURE**

Take the hank (normally, prepared for denier check) of textured yarn for the analysis. Note down the actual weight of the sample. Take required amount of petroleum ether along with sample in the vessel/ conical flask. Immerse the yarn sample in petroleum

ether for extraction of oil for 15 min. After 15 min take out sample, squeeze it completely and then place the yarn in the tray kept in open air for 20 min. Then put the hanks in oven at temperature of 85°C. Take out the yarn from the oven after drying up to 15 min. Keep the yarns for cooling room temperature for 15-20 min. Weigh the yarn and note down the weight.

#### B-4 CALCULATIONS

Calculate the per cent oil pick up (OPU) by the following formula:

$$\text{OPU, percent} = \frac{\text{Mass of sample} - \text{Mass of sample after final drying} \times 100}{\text{Mass of the sample}}$$

## ANNEX C

( Table 1 )

### METHODS FOR DETERMINATION OF MOISTURE CONTENT

#### C-1 PRINCIPLE

The specimen is conditioned in the standard atmosphere, weighed, oven dried, weighed again and the moisture content is calculated. From this the moisture regain is calculated and expressed as a percentage.

#### C-2 APPARATUS

##### C-2.1 Precision Balance

##### C-2.2 Stainless Steel Vessels

##### C-2.3 Forceps

**C-2.4 Hot Air Oven** — Capable of maintaining at  $110 \pm 5^\circ\text{C}$ .

#### C-3 CONDITIONING OF SAMPLES

The samples shall be allowed to condition at temperature of  $27 \pm 2^\circ\text{C}$  and a relative humidity of  $65 \pm 2$  percent before carrying out the tests. All tests

shall also be performed under standard conditions (see IS 6359).

#### C-4 PROCEDURE

Weigh the sample before the test ( $W_1$ ) and dry in the oven at a temperature of  $110 \pm 5^\circ\text{C}$ . After thirty minutes weigh the sample and record its mass. Subsequently carry out the weighing every twenty minutes until a constant mass ( $W_2$ ) is obtained. Calculate the moisture content using the relations:

$$W = W_1 - W_2 \quad (1)$$

$$\text{Moisture content, percent} = \frac{100 \times W}{W_2 - W}$$

#### C-5 CALCULATION

Calculate the moisture regain by the following formula:

$$\text{Moisture regain, percent} = \frac{\text{Moisture content} \times 100}{100 - \text{Moisture content}}$$

**ANNEX D**

( Foreword )

**COMMITTEE COMPOSITION**

Man-Made Fibres, Cotton and their Products Sectional Committee, TXD 31

<i>Organization</i>	<i>Representative(s)</i>
Textiles Committee, Mumbai	SHRI S. ULAGANATHAN ( <b>Chairman</b> ) SHRI J. D. BARMAN ( <i>Alternate</i> )
Association of Synthetic Fibre Industries, New Delhi	SHRI M. S. VERMA
Bidhata Industries Pvt Ltd., Mumbai	SHRI R. K. PACHERIWALA SHRI ROHIT PACHERIWALA ( <i>Alternate</i> )
Central Institute for Research on Cotton Technology, Mumbai	DR P. K. MANDHYAN DR G. KRISNA PRASAD ( <i>Alternate</i> )
Confederation of Indian Textile Industry, New Delhi	SHRI D. K. NAIR SHRI SHAJU MANGALAM ( <i>Alternate</i> )
Consumer Guidance Society of India Mumbai	DR SITARAM DIXIT DR M. S. KAMATH ( <i>Alternate</i> )
Cotton Association of India, Mumbai	SECRETARY
Grasim Industries Limited, Vadodara	SHRI AJAY SARDANA DR ROHITASVA KUMAR ( <i>Alternate</i> )
In Personal Capacity	SHRI A. SATHEESAN
Office of the Textile Commissioner	SHRI ASHOK HAZRA SHRI SOURABH KULKARNI ( <i>Alternate</i> )
Reliance Industries Limited, Mumbai	SHRI PRAKASH NARAYAN SHRI SANJEEV JAISINGH ( <i>Alternate</i> )
The Bombay Textile Research Association, Mumbai	SHRI LEKHRAJ GALAV SHRI RAVIKANT ( <i>Alternate</i> )
The Cotton Corporation of India Ltd, Navi Mumbai	SHRI P. N. PILLEWAR SHRI V. K. SINHA ( <i>Alternate</i> )
The Cotton Textile Export Promotion Council, Mumbai	SHRI SIDDARTHA RAJGOPAL
The Southern India Mills' Association, Coimbatore	SHRI D. SURESH ANAND KUMAR
The Synthetic & Rayon Textile Export Promotion Council, Mumbai	SHRI S. K. KHANDELIA SHRI PRAVEEN KUMAR S. SADH ( <i>Alternate</i> )
The Synthetic and Art Silk Mills Research Association, Mumbai	DR MANISHA MATHUR

*Member Secretary*

SHRI A. K. BERA  
SCIENTIST 'F' AND HEAD (TEXTILES), BIS





## Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act, 2016* to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

### Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Director (Publications), BIS.

### Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards: Monthly Additions'.

This Indian Standard has been developed from Doc No.: TXD 31 (13285).

### Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

## BUREAU OF INDIAN STANDARDS

### Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002  
Telephones: 2323 0131, 2323 3375, 2323 9402

Website: [www.bis.gov.in](http://www.bis.gov.in)

### Regional Offices:

	Telephones
Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	{ 2323 7617 2323 3841
Eastern : 1/14 C.I.T. Scheme VII M, V.I.P. Road, Kankurgachi KOLKATA 700054	{ 2337 8499, 2337 8561 2337 8626, 2337 9120
Northern : Plot No. 4-A, Sector 27-B, Madhya Marg CHANDIGARH 160019	{ 265 0206 265 0290
Southern : C.I.T. Campus, IV Cross Road, CHENNAI 600113	{ 2254 1216, 2254 1442 2254 2519, 2254 2315
Western : Manakalaya, E9 MIDC, Marol, Andheri (East) MUMBAI 400093	{ 2832 9295, 2832 7858 2832 7891, 2832 7892

**Branches :** AHMEDABAD. BENGALURU. BHOPAL. BHUBANESHWAR. COIMBATORE.  
DEHRADUN. DURGAPUR. FARIDABAD. GHAZIABAD. GUWAHATI.  
HYDERABAD. JAIPUR. JAMMU. JAMSHEDPUR. KOCHI. LUCKNOW.  
NAGPUR. PARWANOO. PATNA. PUNE. RAIPUR. RAJKOT. VISAKHAPATNAM.

Published by BIS, New Delhi