

**भारतीय मानक ब्यूरो**  
**BUREAU OF INDIAN STANDARDS**  
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*भारतीय मानक मसौदा*

**वस्त्रादि — शुद्ध नए ऊन से निर्मित कालीन धागा — विशिष्टि**  
**( IS 10921:1984 का पहला पुनरीक्षण )**

*Draft Indian Standard*

**Textiles — Carpet Yarn Made from Pure New Wool — Specification**

**( First Revision of IS 10921:1984 )**

ICS 59.080.20

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Wool, Wool Products and Textile Floor Covering  
Sectional Committee, TXD 04

Last date for receipt of comment is  
**23 September 2024**

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**FOREWORD**

*(Formal clauses will be added later)*

The present revision has been made in the light of experience gained since its publication and to incorporate the following major changes:

- a) Title of the standard has been modified to substitute the 'pure new wool' for 'virgin wool' in line with the latest practices;
- b) Scope of the standard has been modified;
- c) References to Indian Standard given in Annex A has been updated;
- d) Requirement for invoice mass has been modified and provision has been made to keep it as per agreement between buyer and seller in addition to specified value;

- e) Requirements for colour fastness to shampooing and abrasion resistance have been added;
- f) Provision has been made for the use of permethrin, bifenthrin, chlorofenapyr, sulcofuran, fibronil or otherwise any suitable chemicals as mothproofing agent;
- g) Terminologies given in the standard have been modified;
- h) Marking and Sampling clauses have been modified; and
- j) Packaging clause has been modified.

## 1 SCOPE

This standard prescribes the manufacturing details and other requirements of yarn manufactured using pure new wool and used for the piles or tufts of carpets.

## 2 REFERENCE

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 these standards.

## 3 MANUFACTURE

The yarn shall be evenly spun from pure new wool having minimum fibre length of 45 mm and of hairiness grade III or better and fineness grade D or better when measured as per the method given in Annex B. The yarn shall also be fully scoured.

## 4 TERMINOLOGY

**4.1 Wool Yarn** — Woollen, semi-worsted, worsted spun yarn or hand spun, hand carded or felted yarns.

**4.2 Metric count** — Number of 1 000 metres hanks in, one kilogram.

**4.3 Tex** — Mass of 1000 metres of yarn in grams.

## 5 REQUIREMENTS

**5.1** The carpet yarn made from virgin wool shall meet the requirements given in Table 1.

**Table 1 Requirements for Wool Carpet Yarn**  
(Clauses 5.1 and 8.4)

<b>SI No.</b>	<b>Characteristic</b>	<b>Requirement</b>	<b>Method of Test, Ref to</b>
(1)	(2)	(3)	(4)
(i)	Count of yarn, tex (metric count)	As declared $\pm$ 10 percent	IS 681
(ii)	Fibre length, mm, <i>Min</i>	45	IS 1377
(iii)	Fibre:		Annex B
	a) Hairiness grade b) Fineness grade	Between I and III Between A and D	
iv)	Twist		
iv)	a) Direction of twist, plied yarn  b) Twist factor ( <i>see</i> Note 1)  1) Single yarn  2) Plied yarn	Opposite to the direction of twist in single yarn  As agreed between the buyer and the seller $\pm$ 5 -do-	IS 832 (Part 1)
v)	Wool content, percent, <i>Min</i>	99	IS 8476
vi)	Extractable matter, percent, <i>Max</i>	1.0	IS 4390
vii)	Invoice mass	Shall conform to the correct invoice mass calculated at 17 percent commercial regain or as agreed between buyer and seller	IS 4902
viii)	Abrasion resistance (Weight loss after 1000 cycles), mg, <i>Max</i>	70	IS 12673 (Part 3)
ix)	Colour fastness to (for dyed yarn)		
	a) Light	4 or better	IS/ISO 105-B02
	b) Washing		IS/ISO 105-C10
	i) Change in colour of test specimen	4 or better	
	ii) Staining on adjacent fabric	4 or better	
	c) Rubbing		IS/ISO 105-X12
	i) Dry rubbing	4 or better	
	ii) Wet rubbing	3 or better	
	d) Shampooing		IS 11969
	i) Change in colour of	4 or better	

	test specimen		
	ii) Staining on adjacent fabric	3 or better	
<p>NOTE — Twist factor can be calculated as below by using turns per metre and linear density:</p> $\text{Twist Factor} = \frac{\text{Turns per metre}}{100} \times (\sqrt{\text{linear density in tex}})$			

## 6 PACKING

The yarn shall be packed securely so as to allow normal handling and transport without tearing and exposing the contents. The yarn may be supplied in hanks, cones or cheeses as agreed to between the buyer and the seller and packed in suitable packaging material. Details of the packing shall be as agreed to between the buyer and the seller.

## 7 MOTHPROOFING

The yarn packages shall be rendered moth-proof with permethrin, bifenthrin, chlorofenapyr, sulcofuran, fibronil or otherwise by any suitable chemicals which will not have toxic effect on human body. The manufacturer shall declare the mothproofing chemicals used, its minimum residual content and the method of test for determining the same.

## 8 MARKING

**8.1** Each yarn package shall be marked with the followings:

- a) Manufacturer's name, initials or trade-mark, if any;
- b) Batch /lot number;
- c) Description of yarn, that is, 'carpet yarn made from pure new wool';
- d) Count of yarn;
- e) Net mass of the package;
- f) Month and year of manufacture;
- g) If desired by the buyer, the words 'Treated for Moth-Resistance'; and
- h) Any other information/instruction provided by the manufacture/required under law.

### 8.2 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.

## 9 SAMPLING AND CRITERION FOR CONFORMITY

**9.1 Lot** — The quantity of the carpet yarn of the same count and composition, manufactured from the same quality of raw wool and delivered to the buyer against one dispatch note shall constitute a lot.

**9.2** Unless otherwise agreed between the buyer and the seller, the number of pieces to be selected at random shall be in accordance with col 1 and col 2 of Table 2. To ensure randomness of selection IS 4905 may be used.

**9.3 Number of Test Specimens and Criteria for Conformity:**

Number of test specimens and criteria for conformity shall be as given in Table 3.

**Table 2 Sample Size and Criteria for Conformity**

*(Clause 9.2)*

SI No.	No. of Bales or Cases in the Lot	No. of Bales or Cases to be Selected	Permissible Number of Non-conforming Bales of Cases	Sub-sample Size
(1)	(2)	(3)	(4)	(5)
i)	Up to 50	3	0	2
ii)	51 to 150	5	0	2
iii)	151 to 300	8	1	3
iv)	301 to 500	13	2	5
v)	501 and above	20	5	3

**Table 3 Number of Tests and Criteria for Conformity**

*(Clause 9.3)*

SI No.	Characteristics	Number of Samples	Criteria for Conformity
(1)	(2)	(3)	(4)
i)	Fiber length, yarn count, fibre fineness, fibre hairiness, wool content, extractable matter, invoice mass, colour fastness (for dyed yarn), abrasion resistance	According to col 3 of Table 3	Number of non-conforming pieces shall not exceed the corresponding number given in column 4 of Table 2.

ii)	All other requirements	According to col 5 of Table 3	All the test pieces shall meet the requirement
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**ANNEX A**  
(Clause 2.1)

**LIST OF REFERRED INDIAN STANDARDS**

<i>IS No.</i>	<i>Title</i>
IS 681 : 2015	Textiles — Methods for determination of universal count of woollen and worsted yarn ( <i>first revision</i> )
IS 1377 : 1971	Method for determination of mean fibre length of wool ( <i>first revision</i> )
IS 4390 : 2001	Textiles — Method for estimation of solvent soluble matter in textile material ( <i>first revision</i> )
IS 4902 : 1981	Method for determination of correct invoice weight of all wool materials ( <i>first revision</i> )
IS 5910 : 2023	Fineness grades of wool ( <i>second revision</i> )
IS 5911 : 2023	Fineness grades of wool tops ( <i>second revision</i> )
IS 8476 : 1977	Method for determination of wool content in woollen textile materials
IS 12673 (Part 3) : 2014/ ISO 12947-3:1998	Textiles — Determination of the abrasion resistance of fabrics by the Martindale method Part 3 Determination of mass loss ( <i>first revision</i> )
IS/ISO 105-B02 : 2014	Textiles — Tests for colour fastness Part B02 Colour fastness to artificial light: Xenon arc fading lamp test
IS/ISO 105-C10 : 2006	Textiles — Tests for colour fastness Part C10: Colour fastness to washing with soap or soap and soda
IS/ISO 105-X12 : 2016	Textiles — Tests for colour fastness Part X12: Colour fastness to rubbing ( <i>first revision</i> )
IS 832 (Part 1) : 2021 / ISO 2061:2015	Textiles — Determination of twist in yarns Part 1 Direct counting method ( <i>third revision</i> )
IS 4905 : 2015/ ISO 24153 : 2009	Random sampling and randomization procedures ( <i>first revision</i> )
IS 11969 : 2020 ISO 18168 : 2020	Textile floor coverings — Colour fastness to shampooing ( <i>first revision</i> )

**ANNEX B**  
(Clause 3, Table 1)

**METHOD FOR DETERMINATION OF HAIRINESS AND FINENESS GRADE OF  
WOOL FIBRE**

**B-1 GENERAL**

This method specifies the quality grades of undyed medullated wools on the basis of their hairiness and the distribution of coarse fibres.

**B-2 PRINCIPLE**

The determination of grades of undyed medullated wools involves drawing and conditioning a representative sample, preparing slides, and examining fibers under a microscope. Fibers are categorized and counted to determine hairiness and coarseness distribution. Grades are then assigned based on these parameters.

**B-3 GRADES OF UNDYED MEDULLATED WOOL**

The specifications for various grades of undyed medullated wools are defined in Table 4.

**Table 4 Fineness Grades of Undyed Medullated Wools on the Basis of Hairiness and Fibre  
Distribution**  
(Clause B-3)

Sl. No. (1)	Hairiness Grade (2)	Maximum Hairiness Permissible (percent Hairy Fibres)	Fineness Grade (4)	Fibre Distribution Permissible Limit: Percentage Fibres by Count (5)		
				Below 40 $\mu$ m	Below 60 $\mu$ m	Below 80 $\mu$ m

		(3)		<i>Min</i>	<i>Min</i>	<i>Min</i>
i)	I	20.0	A	70.0	-	1.0
ii)	II	35.0	B	60.0	-	3.0
iii)	III	45.0	C	-	90.0	5.0
iv)	IV	60.0	D	-	85.0	10.0
v)	V	70.0	E	-	80.0	15.0

#### **B-4 METHOD OF TEST**

**B-4.1 Sampling and Preparation of Specimens** — Draw a representative sample of wool, sliver or products made therefrom. Prepare test specimen as described in **7.2** of IS 744.

**B-4.2** Condition the test specimen as described in **4.1** of IS 744.

#### **B-5 PREPARATION OF SLIDES**

**B-5.1** Prepare slides by following the procedure as given in **8** of IS 744 and cover them with cover slips. Commence measurement after 30 minutes. Avoid the use of excessive mounting medium as it has a tendency to penetrate the medulla and impart the appearance of a true wool fibre to hairy fibres in course of time.

#### **B-6 PROCEDURE**

**B-6.1** Examine the slides with the aid of a suitable projection microscope as defined in **5.1** and **9.1** of IS 744 at a magnification of 250 instead of 500.

**B-6.2** Identify fibres projected on the entire screen and group them into two categories, namely: (a) hairy fibres, and (b) true plus heterotype fibres as illustrated in Fig. 1 and as defined in 2 above. Enter the data as illustrated in Table 5.

**B-6.3** Count the fibres projected on the inner circle. Then measure and record the number of fibres above the stipulated limit of coarseness as illustrated in Table 5 by following the measurement technique as given in **9.1**, **9.2** and **9.3** of IS 744.

**B-6.4** At least 5000 fibres should be examined for determining the percentage of hairy fibres according to **B-6.2** above (that is over 500 fibres per slide) and 2000 fibres should be examined



according to **B-6.3** above for finding out the distribution of coarse fibres. In actual practice, this takes a lesser time than measuring the actual fibre fineness of 1000 fibres according to IS 744.

**B-6.5** Calculate the grade according to hairiness and also according to the distribution of coarser fibres.

**B-6.6** Care should be taken to ensure that the representative sample is cut once only; and under no circumstances the multiple cuts of the same sample should be included. In other words, the same fibre should not be measured twice.

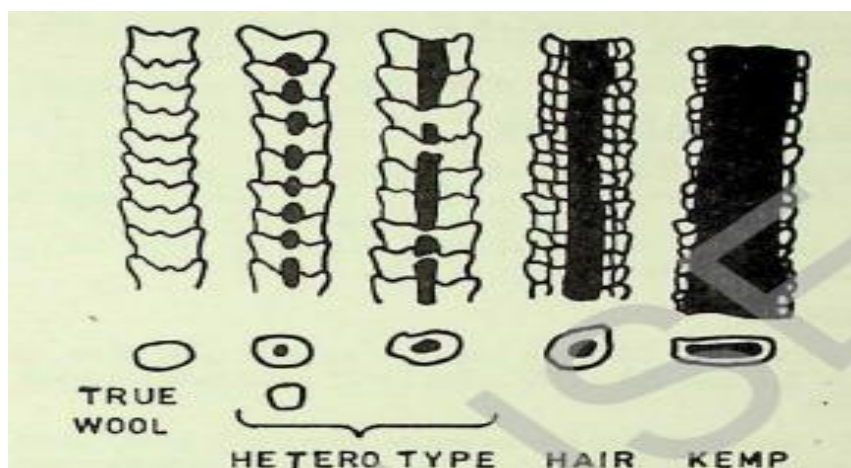


FIG. 1 CLASSIFICATION OF WOOL FIBRES ACCORDING TO MEDULLATION

**Table 5 Example of the Record of Hairiness and Distribution of Coarse Fibres**  
(Clause B-6.2 and B-6.3)

Sl. No. (1)	Fibre Appearance in Full Screen			No. of Fibres on the Inner Circle			
	No. of True Wool + Heterotype Fibres (2)	No. of Hairy Fibres (3)	Total No. of Fibres Viewed (4)	Below 40 $\mu$ m (5)	40 to 60 $\mu$ m (excluding 60 $\mu$ m) (6)	Above 80 $\mu$ m (7)	Total No. of Fibres Viewed (8)

1	15	2	17	2	0	0	3
2	22	7	29	3	1	1	6
3	10	1	11	3	1	0	5
4	7	3	10	2	0	0	3
5	18	4	22	4	2	0	7
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<i>n</i>	32	7	39	8	3	0	13
Total	+160	860	5020	1461	436	52	2180
percentage	82.9	17.1	100	67.0	20	2.4	100

Grade Assigned	I	B
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**B-7 Assignment of Grade**

**B-7.1** Compare percentage of hairy fibres and assign grades I to V as specified in Table I.

**B-7.2** Compare fibre distribution and assign grades A to E, whichever is higher according to fibres below 40  $\mu\text{m}$  or 60  $\mu\text{m}$  or above 80  $\mu\text{m}$ . Fibres above 80  $\mu\text{m}$  are usually kemps.

**B-7.2.1** A few typical examples illustrating the assignment of grades are given below:

*Example 1*

Percentage of hairy fibres	16.8
Percentage of fibres below 40 $\mu\text{m}$	73.0
Percentage of fibres above 80 $\mu\text{m}$	0.3
GRADE ASSIGNED	I-A

*Example 2*

Percentage of hairy fibres	33.5
Percentage of fibres below 40 $\mu\text{m}$	68.0
Percentage of fibres above 80 $\mu\text{m}$	4.7
GRADE ASSIGNED	II-C

*Example 3*

Percentage of hairy fibres	49.7
Percentage of fibres below 60 $\mu\text{m}$	91.3
Percentage of fibres above 80 $\mu\text{m}$	2.5
GRADE ASSIGNED	IV-C

*Example 4*

Percentage of hairy fibres	3.8 ( <i>see note</i> )
Percentage of fibres below 40 $\mu\text{m}$	69.0
Percentage of fibres above 80 $\mu\text{m}$	0.1

GRADE ASSIGNED

I-B

NOTE — Since the hairiness is low, that is, below 5 percent, this wool may be further assessed according to IS 5910 or IS 5911 depending upon whether wool or wool top; for assigning specific fineness grades for example 565, 485, 365, etc.

### FORMAT FOR SENDING COMMENTS ON BIS DOCUMENTS

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<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>	<b>(5)</b>