भारतीय मानक **IS 18892 : 2024**

Indian Standard

वस्त्रादि — सतत बहुतंतु पॉलीप्रोपाइलीन के धागे — विशिष्टि

Textiles — Continuous Multifilament Polypropylene Yarns — Specification

ICS 59.080.20

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September 2024 **Price Group 6**

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

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.

Polypropylene filament yarns are synthetic fibers made from polypropylene, a thermoplastic polymer. It is a lightweight material, making the filament yarns suitable for various applications where weight is a concern. Polypropylene is resistant to many chemicals, making it suitable for applications where exposure to harsh substances is expected. Polypropylene filament yarns are commonly used in the textile industry for making various products such as ropes, twines, mats, geotextiles etc.

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

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 : 2022 ‘Rules for rounding off numerical values (*second revision*)’. 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 — CONTINUOUS MULTIFILAMENT POLYPROPYLENE YARNS — SPECIFICATION

1 SCOPE

1.1 This standard specifies requirements for all types of polypropylene continuous single ply multifilament yarn for various end usages. This standard covers the requirements for both dyed and undyed polypropylene continuous filament yarn.

1.2 This standard covers the requirements for flat, twisted and intermingled polypropylene single multifilament yarn.

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 edition of these standards.

3 TERMS AND DEFINITIONS

3.1 Cross Section — The shape of a fibre when viewed perpendicular to its axis.

NOTE — The shape of man-made fibres can be influenced by the spinning process and subsequent processing and treatments, such as texturizing.

3.2 Flat Yarn — Man-made continuous filaments that have not been twisted or textured.

3.3 Intermingled Yarn — A multifilament yarn in which cohesion is imparted to the constituent filaments usually by passing the yarn through a turbulent air without causing entwining of the filaments and the formation of randomly distributed interlacing points (knots).

NOTE — The knots are not actually the knots tied when two threads are broken but they are the tangle knots created by opening up of filaments and mingling under the influence of air pressure. This creates compact sections in the yarn imparting cohesiveness.

3.4 Shrinkage — The decrease in length of a test specimen caused by a specified treatment, expressed as a percentage of the length of the untreated test specimen. The lengths are measured before and during or after treatment under specified tensions.

3.4.1 *Boiling Water Shrinkage* — The decrease in length of a test specimen caused by a treatment in boiling water for specified time, expressed as a percentage of the length of the untreated test specimen. The lengths are measured before and after treatment under a specified pretension.

3.4.2 *Hot Water Shrinkage* — The decrease in length of a test specimen caused by a treatment in hot water under as specified conditions of temperature and time, expressed as a percentage of the length of the untreated test specimen. The lengths are measured before and after treatment under a specified pretension. The water temperature to be applied is specified between buyer and seller.

3.5 Ovendry Mass — The mass obtained by drying the filament yarn usually after removal of added products such as finish oil, moisture and extractable matters.

3.6 Twisted Yarn — Man-made continuous filaments yarn that have been formed by twisting together two or more filaments are known as twisted yarns.

4 REQUIREMENTS

4.1 The Polypropylene filament yarn (PFY) shall conform to the requirements specified in Table 1 and Table 2 in addition to requirements specified in **4.2**, **4.3**, **4.4** and **4.5** (optional).

4.2 Freedom from Yarn Defects

The PFY shall be free from the following major defects:

4.2.1 *Dirt/Grease*

No soiling or grease spots shall be allowed. It is acceptable, if the spots can be cleaned off. Air strip yarn 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.

4.2.2 *Wound in Waste*

None shall be allowed. Strip to correct or reject to rewind.

4.2.3 *Damaged/Bumped*

None shall be allowed. Strip to correct or reject to rewind.

4.2.4 *Finish Oil Contamination*

Dry or regular oil yarn 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.

Table 1 Physical Requirements for Polypropylene Fully Drawn Yarn

(*Clauses* 4.1 *and* 6.3)

Sl No.	**Characteristic**	**Requirements**		**Method of Test**
		Range	Tolerance	
(1)	(2)	(3)	(4)	(5)
i)	Linear density (denier)	As declared	± 2.0 percent	IS 7703 (Part 1)
ii)	No. of filaments (as declared)	≤ 60 > 60	± 1	Visual inspection under microscope
iii)	Tenacity, gpd, (as declared)	6.1 to 7.5	± 5 percent on declared value	7703 (Part 2)-Dry Method
iv)	Elongation at break, percent, (as declared)	17 to 25	± 5 percent on declared value	IS 7703 (Part 2) Dry Method
v)	Twist per metre, (as declared) (for twisted yarns only)	50 to 250	± 5 percent on declared value	IS 832 (Part 1)
vi)	Number of nips permeter, (for intermingled yarns only)	10 to 35	± 5 percent on declared value	Annex B of IS17262
vii)	Boiling water shrinkage, percent (as declared), *Max*	3.0	-	Annex G of IS17261
viii)	Hot air shrinkage, percent (as declared), *Max*	3.0	-	Annex F of IS17264
ix)	Unevenness of yarn (normal), percent, *Max*	2.0	-	IS 7703 (Part 5)

Table 2 Chemical Requirements for Polypropylene Fully Drawn Yarn

(*Clauses* 4.1 *and* 6.3)

Sl No.	Characteristic	Requirements		Method of Test
		Range	Tolerance	
(1)	(2)	(3)	(4)	(5)
i)	Spin finish oil pick-up, percent, (as declared)	0.40 to 1.3	± 0.2	Annex C of IS 17261
ii)	Moisture regain, percent, *Max*	0.2	-	Annex B of IS 17261
iii)	Phosphorus content, percent, *Min* (for fireretardant yarn only)	0.65	-	Annex D of IS 17261
iv)	Ultraviolet resistance, UV-B Lamp, 144 h, percent retained strength, *Min* (for UV resistant yarn only)	90	-	Annex F of IS 16481
v)	Colour strength with reference to standard yarn, percent (for dope dyed yarns only) (*see* Note)	100	± 4	Annex E of IS 17261
vi)	Colour difference with reference to standard yarn, measured as ΔE, *Max* (for dope dyed yarns only) (*see* Note)	1.0	-	Annex E of IS 17261
vii)	Colour fastness to light (for dope dyed yarns only), *Min*	5	-	IS/ISO 105-B02

NOTES

1 The manufacturer shall declare the L, a, and b values of the colour coordinates of the standard yarn.

2 Either of the requirements indicated at (v) and (vi) needs to be complied with.

4.2.5 *Broken Filaments*

None shall be allowed.

4.2.6 *Texture Colour/Appearance*

No overly shiny or dull yarn shall be allowed.

4.2.7 *Fluorescent Oil*

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

4.2.8 *Crossed Ends*

Nose end crosses can be allowed unless they appear matted or too numerous to count. Up to 25 mm crosses on the tail end shall be allowed or crosses < 6 mm from the tube shall be allowed.

4.2.9 *Slubs/Loops/Kinks*

None shall be allowed.

4.2.10 *Proper Wind*

No patterns or bands, no high or falling off edges and no excessive hard/soft packages shall be allowed.

4.2.11 *Ridges/Grooves*

No ridges or grooves greater than 3 mm high or deep shall be allowed.

4.2.12 *Twist*

For single ply yarns only, Z twist shall rotate clockwise when allowed to relax and S twist will rotate counter- clockwise.

4.2.13 *Proper Ply*

Count the number of ends if the yarn is two ply or more. Air strip the yarn to correct if possible. Also check the tail.

4.2.14 *Latching*

Plies that separate when winding off package shall not be allowed.

4.2.15 *Tail*

Only one tail package per layer shall be permitted. The minimum tail length shall be one wrap around the tube.

4.3 Commercial Mass

The commercial mass shall be obtained by adding mass corresponding to commercial allowance of 6.50 percent to the oven dry mass of the consignment when tested by the methods prescribed in IS 7703 (Part 3) and it shall not be less than the declared commercial mass of the consignment.

4.4 Identification of Polypropylene Yarns

The polypropylene filament yarns shall be identified by microscopic and dissolution test given in IS 667 and melting point of 160 °C, *Min* when tested as per method specified in Annex H of IS 16481.

4.5 Additional Requirements for ECO-Mark (Optional)

For Eco-mark, the product shall also comply with the additional requirements as given in Table 3.

Table 3 Additional Requirements for ECO-Mark (Optional)

(*Clauses* 4.5 *and* 6.3)

Sl No.	Characteristic	Requirement	Method of Test
(1)	(2)	(3)	(4)
i)	Total free and releasable formaldehyde, mg/kg (ppm), *Max*	20	IS 14563 (Parts 1 and 2)
ii)	Extractable heavy metals by artificial acidic sweat/saliva, ppm, *Max*		
	a) Mercury	0.1	Annex A of IS 15651
	b) Chromium III	0.1	
	c) Chromium VI	Not detected	
	d) Lead	0.2	
	e) Cadmium	0.1	
	f) Copper	25	
	g) Antimony	30	
iii)	Pentachlorophenol, ppm, *Max*	0.5	Annex B of IS 15651
iv)	Pesticides (sum parameter), ppm, *Max*	1.0	Annex D of IS 15651
v)	Banned pesticides, ppm, *Max*	Not detected	Annex D of IS 15651
vi)	Banned azo colourants (arylamines), ppm, *Max* (For dyed yarns only) (sum parameters)	20	IS 15570

5 PACKING

5.1 The continuous filament polypropylene yarn (PFY) shall be wound over bobbins in any mass up to 15 kg of yarn per bobbin. All such packages shall be packed in pallets or cartons, properly strapped using polypropylene/PET straps. Packing materials should be roadworthy/airworthy/seaworthy as agreed to between the buyer and the seller.

5.2 All wooden pallets used for packing are to be heat treated. All wooden/paper packing should be free from infestation/fungal growth.

NOTE — Container fumigation for domestic supply shall be optional.

6 MARKING

6.1 Each carton/pallet of PFY shall be marked with indelible ink, the following information:

a) Name and description of the material;

b) Commercial mass of each carton/Pallet;

c) Manufacturer's name, address and trade-mark (if available);

d) Lot/batch/merge number;

e) Month and year of manufacture; and

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

6.2 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.

6.3 The declared parameters as per Table 1, Table 2 and Table 3 shall be provided in the form of a technical data sheet by either pasting on the package or provided separately linking it with lot/batch/merge no. on request for domestic supplies.

6.4 Instructions for transportation and handling of the material shall also be provided by the manufacturer for proper care of the product.

7 SAMPLING AND CRITERIA FOR CONFORMITY

7.1 Lot

The number of packages in all cartons/pallets of PFY and of the same description delivered to a buyer against one dispatch note shall constitute a lot.

7.2 The number of packages to be selected at random from a lot shall be according to col (3) of Table 4. The packages shall be selected at random from different cartons/pallets to constitute the sample size. To ensure the randomness of selection, IS 4905 may be followed.

7.3 Number of Tests and Criteria for Conformity

7.3.1 The number of packages to be selected for manufacturing defects shall be in accordance with col (5) of Table 4. These packages may be selected from the packages selected for non-destructive tests.

7.3.2 All the packages selected from the lot shall be visually examined for yarn defects as specified in **4.2**. Four such defects will be considered as one major defect. A package shall be considered defective if it contains any major defect. All the packages selected for destructive tests shall be tested for the requirements as specified in **4.1**, **4.2**, **4.3**, **4.4** and **4.5** (optional) as applicable.

7.3.3 The lot shall be declared conforming to the requirements of this standard if the total number of defective packages does not exceed the value given in col (4) of Table 4 for yarn defects or col (6) of Table 4 for other requirements.

Table 4 Number of Packages of Yarn to be Selected

(*Clauses* 7.2, 7.3.1 *and* 7.3.3)

Sl No.	Lot Size	Non Destructive Testing		Destructive Testing	
		No. of Packages to be Selected	Acceptance Number	No. of Packages to be Selected	Acceptance Number
(1)	(2)	(3)	(4)	(5)	(6)
i)	Up to 280	13[1)]	1	8	0
ii)	281 to 500	20	2	8	0
iii)	501 to 1 200	32	3	13	0
iv)	1 201 to 3 200	50	5	13	0
v)	3 201 to 10 000	80	7	20	1

[1)] or lot size when less than 13.

ANNEX A

(*Clause* 2)

LIST OF REFERRED STANDARDS

IS No.	*Title*
IS/ISO 105-B02 : 2014	Textiles — Tests for colour fastness: Part B02 Colour fastness to artificial light: Xenon arc fading lamp test
IS 667 : 1981	Methods for identification of textile fibres (*first revision*)
IS 832 (Part 1) : 2021/ISO 2061 : 2015	Textiles — Determination of twist in yarns: Part 1 Direct counting method (*third revision*)
IS 4905 : 2015/ ISO 24153 : 2009	Random sampling and randomization procedures (*first revision*)
IS 7703	Methods of test for man-made fibres continuous filament flat yarn:
(Part 1) : 1990	Linear density (*first revision*)
(Part 2) : 1990	Dry and wet tenacity and elongation (*first revision*)
(Part 3) : 1991	Commercial mass (*first revision*)
IS 7703 (Part 5) : 1987	Methods of test for continuous filament polyester and polyamide flat yarn: Part 5 Unevenness percentage
IS 14563	Textiles — Determination of formaldehyde:
(Part 1) : 2021/ ISO 14184-1 : 2011	Free and hydrolysed formaldehyde (water extraction method) (*first revision*)
(Part 2) : 2021/ ISO 14184-2 : 2011	Released formaldehyde (vapour absorption method) (*first revision*)
IS 15570 : 2005	Textiles — Method of test — Detection of banned azo colourants in coloured textiles
IS 15651 : 2006	Textiles — Requirements for environmental labelling — Specification
IS 16481 : 2022	Textiles — Synthetic micro-fibres for use in cement based matrix — Specification (*first revision*)
IS 17261 : 2022	Textiles — Polyester continuous filament fully drawn flat yarn — Specification (*first revision*)
IS 17262 : 2022	Textiles — Polyester partially oriented yarn (POY) — Specification (*first revision*)
IS 17264 : 2022	Textiles — Polyester industrial yarns — Specification (*first revision*)

ANNEX B

(*Foreword*)

COMMITTEE COMPOSITION

Technical Textiles for Man-Made Fibers, Cotton and their Products Sectional Committee, TXD 31

Organization	*Representative*(s)
Textile Committee, Mumbai	SHRI KARTIKAY DHANDA **(*Chairperson*)**
All India Cotton Farmer Producer Organization Association, Mumbai	SHRI MANISH PRATAP DAGA SHRI RAJENDRA LAXMAN KARPE (*Alternate*)
Arvind Mills, Ahmedabad	SHRI PABITRA SAHOO SHRI PREM KUMAR (*Alternate*)
Association of Synthetic Fibre Industries, New Delhi	SHRI M. S. VERMA
AYM Syntex, Dadra and Nagar Haveli, Silvassa	SHRI ARNAB SAMANTHA
Central Institute for Cotton Research, Nagpur	DR G. T. BEHERE DR S. MANICKAM (*Alternate*)
Coats Groups, Madurai	SHRI MERIL JENSON
Confederation of Indian Textile Industry, New Delhi	SHRIMATI CHANDRIMA CHATTERJEE SHRI ANMOL GUPTA (*Alternate*)
Consumer Guidance Society of India, Mumbai	DR SITARAM DIXIT DR M. S. KAMATH (*Alternate*)
Cotton Association of India, Mumbai	SHRI ATUL S. GANTARA SHRI VINAYAK N KOTAK (*Alternate*)
Defence Materials and Stores Research and Development Establishment, Kanpur	SHRI ASHOK KUMAR YADAV SHRI BISWA RANJAN DAS (*Alternate*)
Department of Chemicals and Petrochemicals, New Delhi	SHRI O. P. SHARMA
Farmer Representative, Akola	SHRI DILIP THAKARE
Federation of Gujarat Weaver Welfare Association, Surat	SHRI ASHOK JIRAWALA SHRI SANJAY DESAI (*Alternate*)
Garden Silk Mills Pvt Ltd, Surat	SHRI PRASENJIT MANDAL DR SOUMYEN PAL (*Alternate*)
Grasim Industries Limited, Vadodara	SHRIMATI SHAILLEY GARG SHRIMATI ASHMITA PANCHAL (*Alternate*)

Organization	*Representative*(*s*)
ICAR - Central Institute for Research on Cotton Technology, Mumbai	DR SENTHIL KUMAR DR A. ARPUTHARAJ (*Alternate*)
Kotak and Company, Mumbai	SHRI SURESH A. KOTAK
Northern India Textile Research Association, Ghaziabad	SHRI SANJEEV SHUKLA
Office of Textile Commissioner, Mumbai	SHRI SOURABH KULKARNI SHRI PRANAV PARASHAR (*Alternate*)
Reliance Industries Limited, Mumbai	SHRI AJAY GUPTA SHRI KESHAV PAREEK (*Alternate*)
SITRA, Coimbatore	SHRI V. THANABAL SHRI S. SIVAKUMAR (*Alternate*)
South Gujarat Chambers of Commerce and Industry, Surat	SHRI HIMANSHU BODAWALA SHRI ASHISH GUJARATI (*Alternate*)
South Gujarat Warp Knitters Association, Surat	SHRI BRIJESH GONDALIYA SHRI RAMAN MEGOTIA (*Alternate*)
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The Bombay Textile Research Association, Mumbai	SHRI R. A. SHAIKH SHRIMATI SHREYASI NANDY (*Alternate*)
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BIS Directorate General	SHRI J. K. GUPTA, SCIENTIST 'E'/DIRECTOR AND HEAD (TEXTILES) [REPRESENTING DIRECTOR GENERAL (*Ex-officio*)]

Member Secretary
SHRI MAYUR KATIYAR
SCIENTIST 'B'/ASSISTANT DIRECTOR
(TEXTILES), BIS

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