भारतीय मानक
Indian Standard

IS 17265 : 2023

वस्त्रादि — 100 प्रतिशत पालिएस्टर कते हुये कोरा एवं सफेद धागे — विशिष्टि

(दूसरा पुनरीक्षण)

Textiles — 100 Percent Polyester Spun Grey and White Yarns — Specification

(Second Revision)

ICS 59.080.20

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

FOREWORD

This Indian Standard (Second Revision) 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.

Polyester spun yarns are made from ring spinning, open end spinning or airjet/vortex spinning of 100 percent polyester staple (cut) fibers. These spun yarns are used in weaving, knitting (warp knitting, flat knitting and circular knitting), embroidery and crocheting for manufacture of fabrics, apparels and made-ups. Other end-use include upholstery fabrics, curtains, sarees, denims, etc. These are also used as carpet yarns and for other industrial applications such as sewing, rope making, etc. Spun yarn can be either single yarn or multi-fold/ multi-ply yarn also known as doubled/cabled yarns.

This standard was first published in 2019 and subsequently revised in 2022. This standard is being revised again to incorporate the following changes:

a) Table for physical requirements of polyester spun yarn has been modified;
b) Clause for objectionable faults has been modified;
c) Requirement for colour fastness to rubbing, washing and perspiration is made optional;
d) Method of test for yarn hairiness has been modified;
e) Test method for yarn unevenness and yarn imperfections has been modified; and
f) Packing clause has been modified.

The composition of the committee responsible for the formulation of this standard is listed in Annex G.

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 — 100 PERCENT POLYESTER SPUN GREY AND WHITE YARNS — SPECIFICATION

(Second Revision)

1 SCOPE

1.1 This standard specifies requirements for all types of 100 percent polyester spun single, double and multifold grey and white yarns made from virgin and/or recycled polyester fibres.

1.2 This standard doesn't specify requirements for fancy spun yarns such as slub yarn, thick and thin yarn etc.

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 listed in Annex A.

3 TERMS AND DEFINITIONS

For the purpose of this standard, the following definitions shall apply:

3.1 Commercial Allowance — A defined percentage to be added to the oven-dry mass of the material for the calculation of commercial mass and certain other properties. This allowance includes the moisture content and the content of the substances which can be removed during analysis, for example, spin finish, oligomers, wax, tinting colours, etc.

NOTE — The commercial allowance for 100 percent polyester spun yarns shall be 2.0 percent.

3.2 Commercial Mass — The mass obtained by adding to the oven-dry mass of the material the mass corresponding to the conventional allowance and any additions as specified in the test methods.

3.3 Count Lea Strength Product (CSP) — A number obtained by the following relationship:

CSP = Breaking load of a lea in kg × cotton count (Ne) × 2.204 6

3.4 High Tenacity Yarn — A yarn with a significantly higher breaking tenacity than others of the same generic category, generally used because of that main characteristic.

NOTE — At present, the minimum limit used for high tenacity polyester staple fibres used to manufacture spun yarns is 5.5 g per denier.

3.5 Multifold Yarn — A yarn in which three or more single yarns or two or more double yarns are twisted together in one or more operations.

3.6 Oven-Dry Mass — The mass obtained by drying the yarn, usually after removal of added products such as finish or oil and of extractable matters.

3.7 Two-Fold Yarn (Doubled Yarn) — A yarn in which two single yarns are twisted together in one or two operations.

4 CLASSIFICATIONS

The classification of polyester spun yarn shall be declared by the manufacturer as described below:

4.1 Based on Cross Section, For Example

4.1.1 The most common cross-sectional views are as seen in the following figures when seen under a suitably powerful magnifying microscope.

4.1.1.1 *Circular*

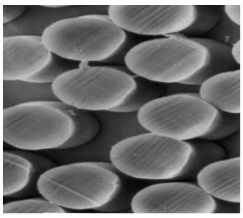


FIG. 1 CIRCULAR

4.1.1.2 *Profiled*

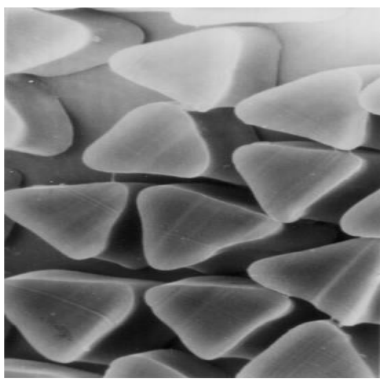


FIG. 2 ANGULAR (TRIANGULAR)

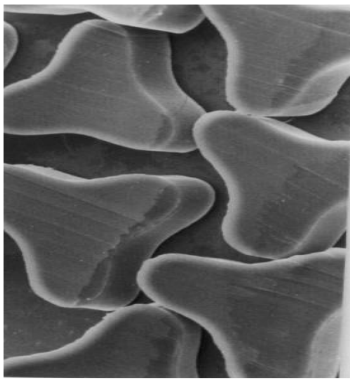


FIG. 3 LOBAL (TRILOBAL)

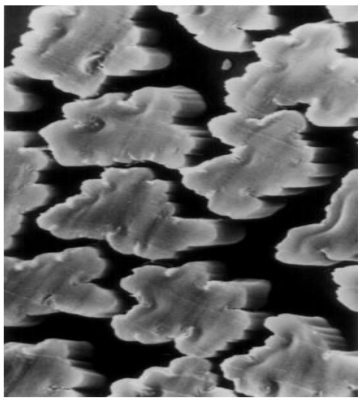


FIG. 4 SERRATED

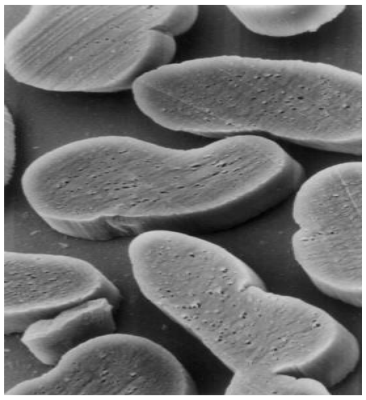


FIG. 5 OVAL (BEAN SHAPED)

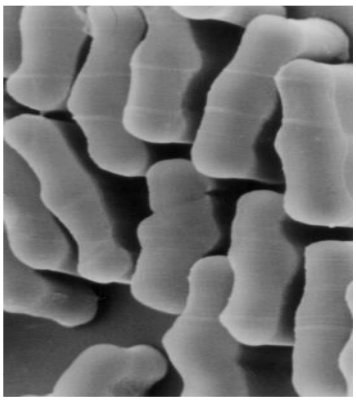


FIG. 6 RIBBONLIKE

4.2 Based on Cross Sectional Area, For Example

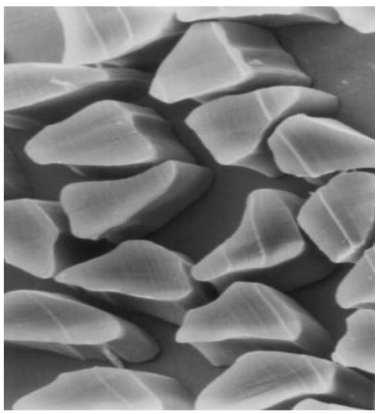


FIG. 7 SOLID

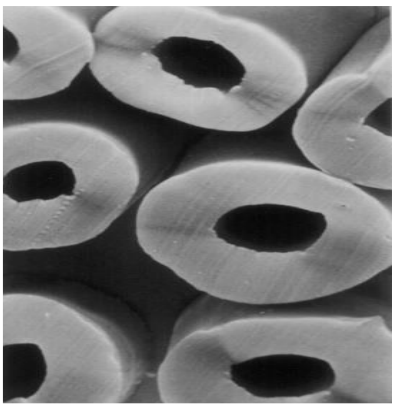


FIG. 8 HOLLOW

4.3 Based on Multi Component Fibres, For Example

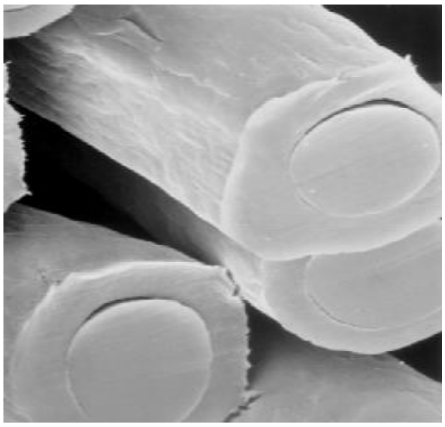


FIG. 9 CONCENTRIC COVER-CORE

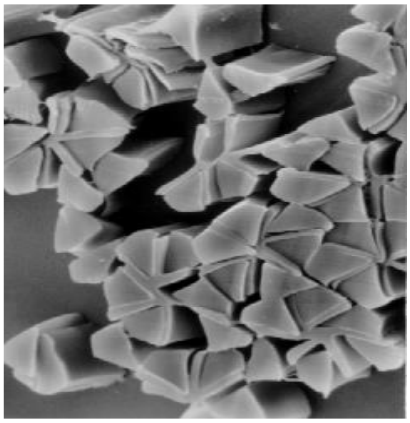


FIG. 10 MATRIX

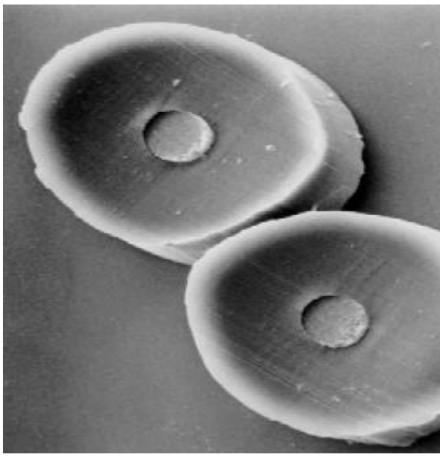


FIG. 11 SHEATH-CORE

4.4 Based on Dyeing Method

4.4.1 Disperse Dyeable [Conventional Dyeable (COD)/Stock Dyeable (STD)/Easy Dyeable (ED)]

4.4.2 Cationic Dyeable (CD)/Easy Dyeable Cationic (EDCD)

4.4.3 Dope Dyed (DD)/Optically White (OW)

NOTE — Undyed yarns may be declared as disperse dyeable [conventional dyeable (COD)/Stock Dyeable (STD)/Easy Dyeable (ED)], Easy Dyeable Cationic (EDCD)/Cationic Dyeable (CD) by the manufacturer depending upon its dyeability.

5 DESIGNATION AND DESCRIPTION OF POLYESTER SPUN YARNS

5.1 Designation of Yarn

A recommended standard notation for yarn designation as per the industry practices based on yarn construction is specified in Table 1. The notation reflects in a condensed form the details of components of a yarn, including values of the linear densities, direction of twist, twist level, number of folds, etc. of these components and/or characteristics such as linear density resulting from this construction. Two methods for the notation of yarns have been specified. The “single to fold” notation starts from the linear density of the single yarn; the “fold to single” notation starts from the linear density of the resultant yarn. The symbols used in both systems are identical; the differences are in the order of presentation, the use of the multiplication sign (x) in the single to fold notation, and of the solidus (/) in the fold to single notation. Distinction between the two methods does not apply to monofilament and multifilament yarns without twist, nor to multiple wound yarns. The following symbols are used:

R = symbol for resultant linear density, to be put before its numerical value;

f = symbol for filaments, to be put before the number of filaments; and

t_0 = symbol for zero twist; other twist values are represented by the number of turns per metre of the twisted yarn, preceded by S or Z to indicate twist direction;

If the S/Z notation cannot be used, for example in numerical fields of data banks, "S" should be designated as (−) and "Z" as (+). The notation is best illustrated by examples given in Table 1:

NOTES

1 Prefixes and multiples shall be written without space.

2 A space shall be used to separate the different characteristics of the yarn construction.

3 '×' or '/' used to mark multiple yarn components shall be separated with spaces.

4 Addition of the resultant linear density in the "single to fold" notation, and of the single yarn linear density in the "fold to single" notation, is not obligatory; such information is separated from the preceding notation by a semi-colon. If not needed, the direction of twist and the twist level may be omitted; however, the description of twist less yarns may include the symbol for zero twist.

5 Values of linear density and of twist level used in commercial transactions are usually nominal values and are subject to tolerances as per this standard.

5.2 IDENTIFICATION AND DESCRIPTION

5.2.1 The material of the yarn, that is polyester, shall be identified by confirmatory tests either as per:

i) Microscopic and dissolution test given in IS 667 and melting point of 240 °C, *Min* when tested as per method specified in Annex J of IS 16481; or

ii) Staining tests given in IS 667.

5.2.2 The polyester spun yarn shall be described using the classification (*see* **4**), the designation of the yarn (*see* **5.1**) and identification of polyester spun yarn as given in Table 2.

Table 1 Examples of Notation of Textile Yarns
(*Clause* 5.1)

Sl No.	Type of Yarn	'Single to Fold' Notation	'Fold to Single' Notation
(1)	(2)	(3)	(4)
i)	**Single yarns**		
	Single yarns without twist	30 tex (20 Ne)	
	Single yarns with twist	30 tex (20 Ne) S800 R30.4 tex (19.4 Ne)	R30.4 tex (19.4 Ne) S800; 30 tex (20 Ne)
ii)	**Multiple wound yarns with**		
	Similar components	19 tex (30 Ne) S155 x 2	
	Dissimilar components	[14 tex(40 Ne) S420 + 9.8 tex (60 Ne) Z80]	
iii)	**Double folded or piled yarns with**		
	Similar components	30 tex (20 Ne) S600 x 2 Z400; R33.4 tex (17.7 Ne)	R44.5 (40 Ne) S360/(S420 + Z80)
	Dissimilar components	[30 tex (20 Ne) S420 + 59 tex (10 Ne) Z80] R 89.2 tex	30 tex (20 Ne) + 59 tex (10 Ne)
iv)	**Cabled yarns with**		
	Similar components	20 tex Z700 x 2 S400 x 3 Z200; R132 tex	R132 tex Z200/3 S400/2 Z700; 20 tex
	Dissimilar components	[20 tex (30 Ne) Z700 x 3 S400 + 34 tex (17 Ne) S600] Z200	R96 tex (6 Ne) Z200/(S600 + S400/3 Z700); 34 tex (17 Ne)

Table 2 Identification of Polyester Spun Yarn
(*Clause* 5.2.2)

Sl No.	Special Characteristics	Examples
(1)	(2)	(3)
i)	Single Yarn	Ne 20s, 30s, 40s
ii)	Fibre Cross-Section	Round, trilobal, serrated, octolobal, triangular
iii)	Lustre	Full Dull (FD), Semi Dull (SD), Bright (BRT), Super Bright (SBRT), Semi Dull Optically Bright (SDOB), Optically Bright (OB)
iv)	Twist per inch	15
v)	Single or Plied	Ne 1/20s, 1/30s, 1/40s, 2/40s,
vi)	Flame Retardant	2/60s FR
vii)	Anti – Microbial	AM
viii)	Ultraviolet Light Resistant	UV
ix)	Optically White	OW
x)	Special Cross Sections	For example, rice shaped, plus shaped
xi)	Low Pill	LP
xii)	Recycled Fibre Yarn	RPSF
xiii)	Moisture Management PSF	MM

NOTES

1 Special characteristics other than above may also be included in the yarns as agreed to between the buyer and seller, provided the finished product meets the requirements of this standard.

2 The description of various special characteristics given in Table 2 is for information and use only to indicate the identification of 100 percent polyester spun grey and white yarns.

6 REQUIREMENTS OF 100 PERCENT POLYESTER SPUN YARN

6.1 The 100 percent polyester spun single, double (two-fold) and multifold yarns shall be manufactured from polyester cut staples and shall meet the physical and chemical requirements specified in Table 3 and Table 4 depending upon whether the yarn is made from virgin fibres or recycled/blended fibres in addition to those specified in Table 5, Table 6, Table 7, and Table 8 (optional) and in **6.2** to **6.7** and in **6.8** (optional).

Table 3 Physical Requirements of Polyester Spun Yarn
(*Clauses* 6.1, 6.2 and 8.2)

Sl No.	Characteristics	Requirement(s)						Method of Test, Ref to
		Virgin Polyester Yarn			Recycled Polyester Yarn			
		Ring Spun	Air Jet	Air Vortex	Ring Spun	Air Jet	Air Vortex	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
i)	Mean linear density (Count), Ne	As declared ± 3.0 percent	As declared ± 3.0 percent	As declared ± 3.0 percent	As declared ± 3.0 Percent	As declared ± 3.0 percent	As declared ± 3.0 percent	IS 1315
	CV, Percent, *Max*							
	a) 37 tex or coarser (Up to 16s Ne)	2.8	1.8	1.3	3.1	2.0	1.3	
	b) 18.5 tex to below 37 tex (Above 16s Ne to up to 32s Ne)	3.1	2.1	2.0	3.4	2.3	2.0	
	c) 12 tex to below 18.5 tex (Above 32s Ne to up to 50s Ne)	3.4	2.3	2.3	3.6	2.5	2.3	
	d) 7.9 tex to below 12 tex (Above 50s Ne to up to 75s Ne)	3.6	2.5	2.7	3.8	2.7	2.7	
	e) Below 7.9 tex (Above 75s Ne)	4.5	3.5	3.0	4.7	3.7	3.0	

Table 3 (*Continued*)

Sl No.	Characteristics	Requirement(s)						Method of Test, Ref to
		Virgin Polyester Yarn			Recycled Polyester Yarn			
		Ring Spun	Air Jet	Air Vortex	Ring Spun	Air Jet	Air Vortex	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ii)	Twist per metre, Average	As agreed ± 10 percent	-	-	As agreed ± 10 percent	-	-	IS 832 (Part 1) or IS 832 (Part 2)
	CV, Percent, *Max*		-	-		-	-	
	a) 37 tex or coarser (Up to 16s Ne)	4.2			4.4			
	b) 18.5 tex to below 37 tex (Above 16s Ne to up to 32s Ne)	4.5			5.2			
	c) 12 tex to below 18.5 tex (Above 32s Ne to up to 50s Ne)	4.8			5.7			
	d) 7.9 tex to below 12 tex (Above 50s Ne to up to 75s Ne)	6.0			6.2			
	e) Below 7.9 tex (Above 75s Ne)	7.0			7.2			
iii)	Average Single yarn tenacity (RKM), g/tex, *Min*							IS 1670

Table 3 (*Continued*)

Sl No.	Characteristics	Requirement(s)						Method of Test, Ref to
		Virgin Polyester Yarn			Recycled Polyester Yarn			
		Ring Spun	Air Jet	Air Vortex	Ring Spun	Air Jet	Air Vortex	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	a) 37 tex or coarser (Up to 16s Ne)	31	22	30	29	20	27	
	b) 18.5 tex to below 37 tex (Above 16s Ne to up to 32s Ne)	29	24	28	27	22	25	
	c) 12 tex to below 18.5 tex (Above 32s Ne to up to 50s Ne)	28	24	27	26	22	24	
	d) 7.9 tex to below 12 tex (Above 50s Ne to up to 75s Ne)	26	21	26	24	19	23	
	e) Below 7.9 tex (Above 75s Ne)	25	19	25	23	17	22	
	CV, Percent, *Max*							
	a) 37 tex or coarser (Up to 16s Ne)	10	11	9.5	10.5	11.5	10.0	
	b) 18.5 tex to below 37 tex (Above 16s Ne to up to 32s Ne)	11	12	10.5	11.5	12.5	11.0	
	c) 12 tex to below 18.5 tex (Above 32s Ne to up to 50s Ne)	13	13	11.5	13.5	13.5	12.0	

Table 3 (*Continued*)

Sl No.	Characteristics	Requirement(s)						Method of Test, Ref to
		Virgin Polyester Yarn			Recycled Polyester Yarn			
		Ring Spun	Air Jet	Air Vortex	Ring Spun	Air Jet	Air Vortex	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	d) 7.9 tex to below 12 tex (Above 50s Ne to up to 75s Ne)	14	14	12.5	14.5	14.5	13.0	
	e) Below 7.9 tex (Above 75s Ne)	16	16	14.5	16.5	16.5	15.0	
iv)	Elongation, Average, Percent, *Min*							IS 1670
	a) 37 tex or coarser (Up to 16s Ne)	11.4	8.5	9.0	9.5	8.0	8.5	
	b) 18.5 tex to below 37 tex (Above 16s Ne to up to 32s Ne)	10.2	8	8.5	9.0	7.5	8.0	
	c) 12 tex to below 18.5 tex (Above 32s Ne to up to 50s Ne)	9.6	7.5	8.0	8.5	7.0	7.5	
	d) 7.9 tex to below 12 tex (Above 50s Ne to up to 75s Ne)	8.5	7.0	7.5	8.0	6.5	7.0	
	e) Below 7.9 tex (Above 75s Ne)	8.0	6.5	7.0	7.5	6.0	6.5	

Table 3 (*Continued*)

Sl No.	Characteristics	Requirement(s)						Method of Test, Ref to
		Virgin Polyester Yarn			Recycled Polyester Yarn			
		Ring Spun	Air Jet	Air Vortex	Ring Spun	Air Jet	Air Vortex	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	CV, Percent, *Max*							
	a) 37 tex or coarser (Up to 16s Ne)	6.5	8.0	7.7	7.0	8.5	8.0	
	b) 18.5 tex to below 37 tex (Above 16s Ne to up to 32s Ne)	7.5	9.0	9.0	8.0	9.5	9.3	
	c) 12 tex to below 18.5 tex (Above 32s Ne to up to 50s Ne)	8.7	10.2	10.0	9.2	10.7	10.2	
	d) 7.9 tex to below 12 tex (Above 50s Ne to up to 75s Ne)	11	11.5	11.0	11.5	12.0	11.5	
	e) Below 7.9 tex (Above 75s Ne)	13	13.5	12.5	13.5	14.0	13.0	
v)	Average Count strength product (CSP), *Min*							IS 1671
	a) 37 tex or coarser (Up to 16s Ne)	5 400	3 400	5 200	4 900	3 400	4 700	
	b) 18.5 tex to below 37 tex (Above 16s Ne to up to 32s Ne)	5 000	3 600	4 700	4 400	3 200	4 200	

Table 3 (*Continued*)

Sl No.	Characteristics	Requirement(s)						Method of Test, Ref to
		Virgin Polyester Yarn			Recycled Polyester Yarn			
		Ring Spun	Air Jet	Air Vortex	Ring Spun	Air Jet	Air Vortex	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	c) 12 tex to below 18.5 tex (Above 32s Ne to up to 50s Ne)	4 600	3 400	4 300	4 100	3 000	3 900	
	d) 7.9 tex to below 12 tex (Above 50s Ne to up to 75s Ne)	4 200	3 000	4 000	3 700	2 500	3 500	
	e) Below 7.9 tex (Above 75s Ne)	3 800	2 300	3 500	3 200	2 100	3 000	
vi)	Yarn hairiness index, *Max*							Annex B
	a) 37 tex or coarser (Up to 16s Ne)	18	15.3	12.6	18	15.3	12.6	
	b) 18.5 tex to below 37 tex (Above 16s Ne to up to 32s Ne)	9	7.7	6.3	9	7.6	6.3	
	c) 12 tex to below 18.5 tex (Above 32s Ne to up to 50s Ne)	7	6.0	4.9	7	5.9	4.9	
	d) 7.9 tex to below 12 tex (Above 50s Ne to up to 75s Ne)	5.5	4.7	3.9	5.5	4.7	3.8	
	e) Below 7.9 tex (Above 75s Ne)	5	4.3	3.5	5	4.2	3.5	

Table 3 (*Concluded*)

Sl No.	Characteristics	Requirement(s)						Method of Test, Ref to
		Virgin Polyester Yarn			Recycled Polyester Yarn			
		Ring Spun	Air Jet	Air Vortex	Ring Spun	Air Jet	Air Vortex	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
vii)	Whiteness index of polyester spun yarn, *Min*							Annex J of IS 17263
	a) Full dull (FD)		65			NA		
	b) Semi dull (SD)		75			NA		
	c) Semi dull optically bright (SDOB)		110			NA		
	d) Optically white		115			NA		
	e) Recycled fibres		NA			35		

NOTES

1 In case of blended yarn, if up to 20% recycled material is added in the virgin material, it should meet the requirements for virgin polyester yarn.

2 In case of blended yarn, if more than 20% recycled material is added in the virgin material, it should meet the requirements for recycled polyester yarn.

3 As agreed to between the buyer and the seller all specialty yarns like fire retardant, ultraviolet resistant, anti-microbial, yarn with moisture management fibre, yarn with hollow fibres etc may have lower average single yarn tenacity (RKM) and/or CSP by 15 percent whereas yarn with low pill fibre may have lower average single yarn tenacity (RKM) and/CSP by 50 percent due to inherent quality.

Table 4 Chemical Requirements of Polyester Spun Yarn
(*Clauses* 6.1 and 6.2)

Sl No.	Characteristic	Requirement	Method of Test, Ref to
(1)	(2)	(3)	(4)
i)	Moisture regain, percent, *Max* at equilibrium condition	1.0	Annex C
ii)	Isophthalic Acid (IPA) content, percent, *Max*		Annex C of IS 16481
	a) Virgin polyester yarn	Not detected	
	b) Dope dyed/white yarn	0.1	
	c) Recycled/blended yarn	2.2	
iii)	Water soluble matter, percent, *Max*	1.2	IS 3456
iv)	Phosphorus content, percent, *Min* (For fire retardant yarn only)	0.65	Annex D
v)	Ultraviolet resistance, 500 h Percent retained strength, *Min* (For UV resistant yarn only)		IS 13162 (Part 2)
	a) Virgin polyester yarn	70	
	b) Recycled/blended yarn	70	
vi)	Anti-microbial activity value, *Min* (For anti-microbial yarn only)	2.0	IS/ISO 20743
vii)	Wettability of woven or knitted fabrics (about 150 gsm) made from the yarns, *Max* (For moisture management yarns only)	10	IS 2349
viii)	Wicking characteristic of woven or knitted fabrics (about 150 gsm) made from the yarn, height in cm, *Min* (For moisture management yarns only)	10	Annex E

6.2 Multifold Yarn

The multifold yarn shall comply with the requirements specified in Tables 3, 4, 5, 6, 7 and 8 (optional) and those specified in **6.2.1** to **6.2.5**.

6.2.1 The tenacity of multifold yarn including double yarn shall be as agreed to between the buyer and the seller.

6.2.2 Tolerance of ± 1.5 percent shall be permissible on the resultant count of yarn and CV percentage of resultant count shall be 3.5 percent, *Max* when tested by the method prescribed in IS 1315.

6.2.3 The lea breaking strength of folded yarn shall be tested as per IS 1671 and CV percentage shall not be more than 6 percent. The count strength product of folded yarn shall be not less than the value calculated from the following formula:

CSP of folded yarn = CSP of corresponding single yarn × $(1.08)^{n-1}$

where n is the number of folds in the yarn.

6.2.4 The ply twist in folded yarn shall be as agreed to between the buyer and the seller and a tolerance of ± 10 percent shall be permissible when tested by the method prescribed in IS 832.

6.2.5 The requirement for classimat/objectionable faults and single yarn tenacity shall not be applicable to double or multifold yarns.

6.3 Freedom from Yarn Defects

The yarn packages shall be free from the following defects (*see also* **9.3.2**):

6.3.1 *Damaged/Bumped*

Only touching impression of up to 5 mm depth may be allowed.

6.3.2 *Dirt/Grease*

No soiling or grease spots shall be allowed. It is acceptable if the spots can be cleaned off. Defect with slight grey/yellow stains shall not be more than 0.5 per kg and more than 5 mm in length.

6.3.3 *Improper Ply*

Count the number of ends if the yarn is two ply or more. Also check the number of tails. No improper ply shall be allowed.

6.3.4 *Improper Wind*

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

6.3.5 *Inadequate Package Clearance*

It shall be 9 mm, *Min* from yarn roll to tail end of cone or cheese and 25 mm *Max* (nominal should be 15 mm).

6.3.6 *Indistinct Tail*

Tail end coils to be distinct and minimum tail length shall be one wrap around the tube. Missing, bunch and multiple tails shall not be off graded. Permissible limit for packages without tail shall be less than 6 percent.

6.3.7 *Latching*

Plies that separate when winding off shall not be allowed.

6.3.8 *Oversize and Small Packages*

Check suspect packages with appropriate gauge, scale, diameter tape or balance. All equal length bobbins of respective products should be graded and packed separately. Unequal length bobbins are to be graded based on their weights and packed in respective grades. Bobbins with different sizes in terms of length and weight, packed in same package shall not be allowed.

6.3.9 *Package Defects*

Crushed, nicked, or cut cones or cheese, especially on the nose end shall not be allowed.

6.3.10 *Twist*

Z twist shall rotate clockwise when allowed to relax and *S* twist rotates counter-clockwise. Missing twist is not allowed.

6.3.11 *Wound in Waste*

May be accepted if it can be corrected by stripping.

6.4 Yarn Unevenness and Yarn Imperfections

The unevenness percentage and yarn imperfections of polyester spun single and double yarns shall be as specified in Table 5 when prescribed by the methods specified in IS 16576.

Table 5 Unevenness (U Percent) and Imperfections of Polyester Spun Yarn
(*Clauses* 6.1, 6.2 and 6.4)

Sl No.	Resultant Yarn Linear Density Range		Yarn Imperfections per km, *Max*			
		U Percent, *Max*	Thin Places, - 50 Percent	Thick Places, + 50 Percent	Neps, + 200 Percent	Total Imperfect — Ions
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i)	6s Ne to up to 16s Ne (37 tex to 98 tex)	10.0	2	18	25	45
ii)	Above 16s Ne to up to 32s Ne (18.5 tex to 37 tex)	11.0	10	32	42	84
iii)	Above 32s Ne to up to 50s Ne (12 tex to 18.5 tex)	11.8	26	47	59	132
iv)	Above 50s Ne to up to 75s Ne (7.9 tex to 12 tex)	13.0	70	70	90	230
v)	Above 75s Ne (below 7.9 tex)	15.0	85	100	125	310

NOTES
1 U percent is tested at speed of 50 m/min at sensitivity level of 50 percent, 3 and 3 for thin and thick places and neps. If agreed to between the buyer and seller testing at different speed and sensitivity level may be done.
2 CV Percent = 1.25 x U percent.
3 As agreed between the buyer and the seller all specialty yarns like fire retardant, ultraviolet resistant, anti-microbial, yarn with moisture management fibre, yarn with hollow fibres etc may have higher total imperfections/km by 10 percent whereas yarn with low pill fibre may have higher total imperfections/km by 15 percent due to inherent quality.

6.5 Objectionable Faults

If required by the buyer, the spun yarns shall meet the requirement of objectionable faults as specified in Table 6 when tested with the method given in Annex F with classification of classimat III system given below:

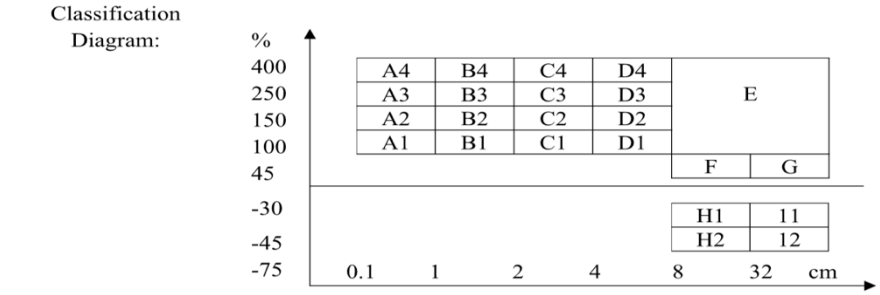
The sum of total number of objectionable faults that is, A3, A4, B3, B4, C2, C3, C4, D2, D3, and D4 shall not exceed the limit specified in Table 6 (see Fig. 12).

6.6 Commercial Mass

The manufacturer shall declare the commercial mass of each consignment of 100 percent polyester spun yarn. The commercial mass obtained by adding mass corresponding to commercial allowance of 2.0 percent to the oven dry mass of the consignment when tested by the method prescribed in IS 7703 (Part 3) shall not be less than the declared commercial mass of the consignment.

6.7 Colour Fastness Properties of PSY

The dyed yarns shall meet the respective colour fastness requirements as specified in Table 7. The requirements of colour fastness to rubbing, colour fastness to perspiration (acidic and alkaline) and colour fastness to washing shall be optional.



Length Classes:
A: Shorter than 1 cm
B: 1 to 2 cm
C: 2 to 4 cm
D: 4 to 8 cm
E: Longer than 8 cm
F and H: 8 to 32 cm
G and I: Longer than 32 cm

Cross- Section Classes:
1: +100 to +150%
2: +150 to +250%
3: +250 to 400%
4: Over +400%
E: Over +100%
F and G: +45 to +100%
H1 and I1: -30 to -45%
H2 and I2: -45 to 75%

FIG. 12 CLASSIMAT III SYSTEM

Table 6 Objectionable Faults of Polyester Spun Yarns
(*Clauses* 6.1, 6.2 and 6.5)

Sl No.	**Yarn Linear Density Range**	**Objectionable Faults per 100 km, *Max***
(1)	(2)	(3)
i)	6s Ne to 16s Ne (37 tex to 98 tex)	2
ii)	> 16s Ne to 32s Ne (18.5 tex to 37 tex)	6
iii)	> 32s Ne to 50s Ne (12 tex to 18.5 tex)	10
iv)	> 50s Ne to 75s Ne (7.9 tex to 12 tex)	15
v)	Above 75s Ne (below 7.9 tex)	20

Table 7 Colour Fastness Properties of Polyester Spun Yarn
(*Clauses* 6.1, 6.2 and 6.7)

Sl No.	Colour Fastness Rating to	Requirement, *Min*			Method of Test, Ref to
		Dope Dyed (DD)/Optically White (OW)	Cationic Dyed (CD)/ Easy Dyeable Cationic (EDCD)]	Disperse Dyed [Conventional Dyed (COD)/Easy Dyed (ED)/Stock Dyed (STD)	
(1)	(2)	(3)	(4)	(5)	(6)
i)	Light				IS/ISO 105-B01 or IS/ISO 105-B02
	Change in colour	7	5	5	
ii)	Washing, test 2 (optional)				IS/ISO 105-C10
	a) Change in colour b) Staining	5 4	4 3	4 3	
iii)	Rubbing (optional)				IS/ISO 105-X12
	a) Dry b) Wet	5 4	4 3	4 3	
iv)	Perspiration (acidic and alkaline) (optional)				IS/ISO 105-E04
	a) Change in colour b) Staining	5 4	4 4	4 4	

6.8 Additional Requirements for Ecomark (Optional)

For Ecomark, the product shall also comply with the additional requirements as given in Table 8.

Table 8 Additional Requirements for ECO-Mark (Optional)
(*Clauses* 6.1, 6.2 and 6.8)

Sl No.	Characteristics	Requirement	Method of Test
(1)	(2)	(3)	(4)
i)	Free and releasable formaldehyde, mg/kg (ppm), *Max*	20	IS 14563 (Part 1) and IS 14563 (Part 2)
ii)	Extractable heavy metals by artificial Acidic sweat/saliva, ppm, *Max*		Annex A of IS 15651
	a) Mercury	0.1	
	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), mg/kg (ppm), *Max* (for dyed yarn only) (sum parameters)	20	IS 15570

7 PACKING

7.1 The spun yarn shall be wound over paper/plastic cones/bobbins/cheeses in any mass as agreed between the buyer and the seller. All packages shall be packed in pallets or cartons or laminated high density polyethylene/polypropylene bags, or any other packaging as agreed between the buyer and seller. The packaging shall be properly strapped using polypropylene/PET straps. Packing materials should be roadworthy/airworthy/seaworthy as agreed to between the buyer and the seller.

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

NOTE — Container fumigation for domestic supply should be optional.

8 MARKING

8.1 Each carton/pallet of polyester spun yarn shall be marked with indelible ink, the following information:

a) Name and description of the material (*see* **5.2**);
b) Designation of the material (*see* **5.1**);
c) Commercial mass of each carton/pallet;
d) Manufacturer's name, address and trade-mark (if available);
e) Lot/batch/merge number;
f) Month and year of manufacture; and
g) Any other information required by the law in force.

8.1.1 *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.

8.2 The declared parameters as per 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.

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

9 SAMPLING AND CRITERIA FOR CONFORMITY

9.1 Lot

The number of packages (*see* **7.1**) in all cartons/pellets of polyester spun yarn of the same description and designation delivered to a buyer against one dispatch note shall constitute a lot.

9.2 The number of packages to be selected at random from a lot shall be according to col (2) of Table 9. 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.

9.3 Number of Tests and Criteria for Conformity

9.3.1 The number of packages to be selected for manufacturing defects shall be in accordance with col (3) of Table 9. For all other properties, the number of packages selected shall be in accordance with col (5) of Table 9. These packages may be selected from the packages selected for non-destructive tests. **9.3.2** All the packages selected from the lot shall be visually examined for yarn defects as specified in **6.3**. 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 **6.1**, **6.2** and **6.4** to **6.8** as applicable.

9.3.3 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 9 for yarn defects or col (6) of Table 9 for other requirements.

Table 9 Number of Packages of Yarn to be Selected

(*Clauses* 9.2, 9.3.1 and 9.3.3)

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 – 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

[1] or lot size when less than 13.

ANNEX A
(*Clause* 2)

LIST OF REFERRED STANDARDS

IS No.	*Title*
IS/ISO 105	Textiles — Tests for colour fastness:
B01 : 2014	Colour fastness to light: Daylight
B02 : 2014	Colour fastness to artificial light: Xenon arc fading lamp test.
IS/ISO 105	Textiles — Tests for colour fastness:
C10 : 2006	Colour fastness to washing with soap or soap and soda
E04 : 2013	Colour fastness to perspiration (*first revision*)
X12 : 2016	Colour fastness to rubbing (*first revision*)
IS 667 : 1981	Methods for identification of textile fibres (*first revision*)
IS 832	Textiles — Determination of twist in yarns:
(Part 1) : 2021	Direct counting method (*third revision*)
(Part 2) : 2011	Untwist/retwist method for single spun yarns (*second revision*)
IS 1315 : 1977	Method for determination of linear density of yarns spun on cotton system (*first revision*)
IS 1670 : 1991	Textiles — Yarn — Determination of breaking load and elongation at break.
IS 1671 : 1977	Method for determination of yarn strength parameters of yarns spun on cotton system (*first revision*)
IS 2349 : 2022	Method for determination of wettability of cotton fabrics (*first revision*)
IS 3456 : 2022	Method for determination of water soluble matter of textile materials (*first revision*)
IS 4905 : 2015	Random sampling and randomization procedures (*first revision*)
IS 6359 : 2023	Method for conditioning of textiles (*first revision*)
IS 7703 (Part 3) : 1991	Methods of test for man-made fibre continuous filament flat yarn: Part 3 Commercial mass (*first revision*)
IS 13162 (Part 2) :1991	Geotextiles — Methods of test: Part 2 Determination of resistance to exposure of ultra-violet light and water (xenon arc type apparatus)
IS 14563	Textiles — Determination of formaldehyde:
(Part 1) : 2021	Free and hydrolysed formaldehyde water extraction method (*first revision*)
(Part 2) : 2021	Released formaldehyde vapour absorption method (*first revision*)
IS 15570 : 2005	Textiles — Method of test — Detection of banned azocolourants 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 16576 : 2022	Textiles — Unevenness of Textile Strands — Capacitance Method (*first revision*)
IS 17263 : 2022	Textiles — Polyester staples fibres — Specification (*first revision*)
IS/ISO 20743 : 2013	Textiles — Determination of antibacterial activity of textile product.

ANNEX B
(*Table* 3)

DETERMINATION OF HAIRINESS INDEX

B-1 HAIRINESS INDEX

In the Hairiness measurement unit, the hairiness of 1 cm yarn length is considered. A hairiness index is defined as total length of the protruding fibres with reference to the sensing length of 1 cm. H is a ratio of two lengths (of hairs and yarn), it is therefore a non-dimensional quantity.

B-2 MEASURING PRINCIPLE AND PROCEDURE

In the Hairiness tester, measuring field is formed by a homogeneous field of parallel light (infra-red rays). If yarn lies in this measuring field, only those rays that have been scattered by the fibres protruding from the main body of the yarn reach the detector. This scattered light results from the refraction, the diffraction, and the reflection at each of the separate fibres that is, the protruding fibres seems to become luminous. This scattered light is the measure of the hairiness and can be measured electrically. The detector transforms the light received into a proportional electrical signal.

During measurement the yarn traverse at a speed of 400 m/min for time duration of 1 min in the measuring field. The measurement is undertaken by the instrument fully automatically based on minimum 10 observations per test.

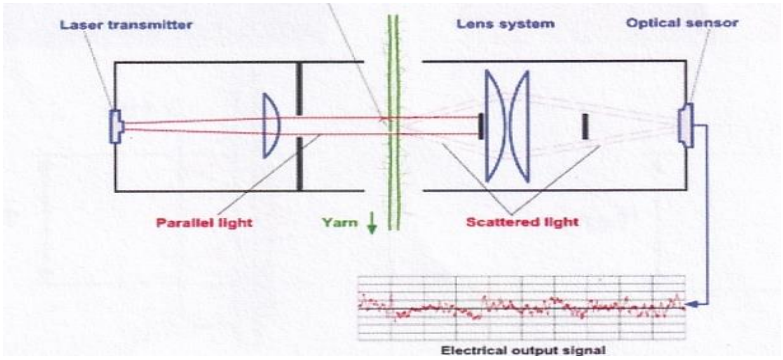


FIG. 13 HAIRINESS TESTING PRINCIPLE

ANNEX C
(*Table* 4)

METHOD FOR DETERMINATION OF MOISTURE REGAIN

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 ± 5) °C.

C-2.5 Wrap Reel

C-3 CONDITIONING OF SAMPLES

The samples shall be allowed to condition at temperature of (27 ± 2) °C and a relative humidity of 65 ± 2 percent before carrying out the tests. All tests shall also be performed under standard conditions (*see* IS 6359).

C-4 PROCEDURE

Weigh the yarn skein before the test (W_1) and dry in the oven at a temperature of (110 ± 5) °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:

$$W = W_1 - W_2 \qquad \ldots. (1)$$

$$\text{Moisture content, percent} = \frac{100 \times W}{W_1}$$

C-5 Calculate the moisture regain by the following formula:

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

ANNEX D
(*Table* 4)

DETERMINATION OF PHOSPHORUS CONTENT

D-1 INTRODUCTION

This method is applicable to determine phosphorus content in polymer by colorimetry. Phosphorous present in polymer sample is converted to water soluble orthophosphate form. This solution is then reacted with ammonium molybdate to form molybdo phosphoric acid complex. This complex is reduced to blue colour by sodium sulfite. Intensity of this complex is measured at 710 nm using ultraviolet-visible spectrophotometer.

D-2 PURPOSE

a) Phosphorous additives are added during polymerization to control thermal degradation; and
b) Phosphrous is added for flame retardant properties also.

D-3 REAGENTS

D-3.1 Ten Percent Sulfuric Acid Solution (2 litres)

Add 100 ml of sulfuric acid in 2 000 ml beaker containing 500 ml demineralized water, cool the beaker to room temperature and filter. Transfer the contents to 1 000 ml flasks and make up the volume with demineralized water.

D-3.2 Five Percent Ammonium Molybdate Solution (500 ml)

Weigh 25 g of ammonium molybdate and add to the 500 ml volumetric flask containing of 10 percent sulphuric acid; dissolve the salt then make upto the mark using 10 percent sulphuric acid solution (filter if necessary).

D-3.3 Half Percent Hydroquinone Solution (500 ml)

Weigh 2.5 g of hydroquinone and to the 500 ml volumetric flask containing 5 ml of 1 N sulfuric acid; dissolve the salt then make up to the mark using demineralized water (filter if necessary).

D-3.4 Twenty Percent Sodium Sulphite Solution (500 ml)

Weigh 100 g of sodium sulphite and add to the 500 ml volumetric flask containing 300 ml of demineralized water; dissolve the salt then make up to the mark using demineralized water (filter if necessary).

D-3.5 Zinc Oxide Solution (200 ml)

Dissolve 20 g of zinc oxide in 200 ml of 10 percent sulphuric acid solution (filter if necessary).

D-3.6 Whatman Filter Paper No. 1

D-4 PROCEDURE

D-4.1 Preparation of Standard Solutions

Weigh 5.742 g of disodium hydrogen ortho phosphate dihydrate and add to the 1 000 ml volumetric flask containing 150 ml of 10 percent sulphuric acid; dissolve the salt then make up to the mark using demineralized water. From the above flask 25 ml of solution is taken out in 250 ml volumetric flask and make up to the mark using demineralized water, this will give 100 ppm standard solution of phosphorus. From the above flask of 100 ppm solution, 10 ml of solution is taken out in 100 ml volumetric flask and make up to the mark using demineralized water, this will give 10 ppm standard solution of phosphorus. This solution is taken for calibration purpose (liquid phosphorous standard).

D-5 CALIBRATION STANDARD SOLUTION

From the liquid phosphorous standard solution made above, take 2.5 ml, 5 ml, 7.5 ml, 10 ml and 15 ml solution in 100 ml standard volumetric flasks and add 20 ml zinc oxide solution to each flask. This will correspond to 0.25 ppm, 0.5 ppm, 0.75 ppm, 1 ppm, 1.5 ppm of phosphorous solution. Plot the graph for concentration in mg of phosphorous in 100 ml (X axis) v/s Absorption (Y axis). Calculate the slope factor (SF) from graph ($y = mx + c$).

D-6 ANALYTICAL PROCEDURE

D-6.1 Weigh 1 g to 1.5 g polyester chips/yarn sample for low content phosphrous expected ~ 10 to 50 ppm. For higher contents expected 6 000 to 7 000 ppm as phosphorus, sample weight to be taken around 0.1 g in silica crucible. Keep on hot plate at 150 °C for 20 min for shrinking. Remove the crucible and cool it. Add 1.5 g of zinc oxide over the polymer sample to cover it. Keep the crucible on hot plate at 250 °C to 280 °C for 20 min to 30 min, and then add 0.5 g of zinc oxide again in hot condition. Keep the silica crucible in furnace at 600 °C for 60 min (sample will turn into white-yellowish mass) then remove the silica crucible and cool.

D-6.2 Add 20 ml of 10 percent sulphuric acid to the sample in silica crucible and dissolve the sample. Keep the sample silica crucible on the hot plate at 100 °C for 10 min (till it become clear solution), cool the solution. Filter the sample solution from silica crucible if solution is not clear using Whatman filter paper No. 1. Collect the filtrate in 100 ml standard volumetric flask. Add reagents mentioned in **D-6.3**. Dilute up to the mark with demineralized water. If expected phosphorus is 7 000 ppm – 8 000 ppm then dilute the solution to 100 ml with demineralized water and from this solution take 10 ml solution (10 times dilution is done due to high level of phosphorus) and add 18 ml of zinc oxide solution and then add reagents mentioned in **D-6.3** to it.

D-6.3 Add following solution to each 100 ml standard volumetric flask as per the sequence given below:

a) Ten milliliters ammonium molybdate;
b) Five milliliters sodium sulphite; and
c) Five milliliters hydroquinone.

D-6.4 Make up to 100 ml with demineralized water. Take two 100 ml volumetric flasks (labeled as A and B). In A, add 5 ml of liquid phosphorus standard and B use as a blank. Add 20 ml zinc oxide solution to each flask Add reagents mentioned in **D-6.3** to it. Stopper and shake all the flasks, keep the flask in dark for 60 min. Take the absorbance reading in ultraviolet spectrophotometer at 710 nm using 50 mm cuvette.

D-7 CALCULATION

$$\text{Phosphorus content, ppm} = \frac{\text{Absorbance} \times 1\,000 \times \text{Dilution factor (if any)}}{\text{Sample weight (slope factor)}}$$

D-7.1 Slope factor = 10/Slope [of the graph of absorbance v/s concentration (mg/ml)].

D-7.2 Report phosphorous content of the sample in ppm.

ANNEX E
(*Table* 4)

METHOD FOR DETERMINATION OF WICKING DISTANCE OF MOISTURE MANAGEMENT FABRICS

E-1 PRINCIPLE

A straight vertical fabric strip is wetted in water for specified time and its wicking distance on the strip is measured.

E-2 APPARATUS

E-2.1 Woven fabric made out from 100 percent polyester spun yarns 2/30s Ne, plain weave, 150 g per square meter. Knitted fabric made out from 100 percent polyester spun yarns, 1/30s Ne, single jersey, 150 g per square meter.

E-2.2 Vertical Wicking Apparatus

The schematic diagram of the experimental setup for measurement of vertical wicking is shown in Fig. 14. The fabric is tinted to facilitate visual tracking of the movement of water.

E-2.3 Measuring Glass Beaker

E-2.4 Measuring Scale

E-2.5 Metallic Clip — about 3g of weight to hold the specimen straight in water.

E-2.6 Vertical Stand — with clamp and platform as shown in Fig. 14.

E-2.7 Distilled Water

E-3 PREPARATION OF TEST SPECIMENS

Cut specimens of 200 mm × 25 mm size in each lengthwise and widthwise directions of fabric in **E-2.1**. While cutting the specimens, leave at least 10 cm distance from the edges and from each other. Remove any wrinkles and after straightening, condition in the standard atmosphere for minimum 8 h.

E-4 CONDITIONING AND TESTING ATMOSPHERE

The fabric specimens shall be conditioned for minimum 8 h in a standard atmosphere of (20 ± 2) °C and 65 ± 2 percent relative humidity (*see* IS 6359) and test shall be conducted in this standard atmosphere.

E-5 PROCEDURE

E-5.1 Cut 5 specimens in each direction, all measuring 200 mm × 25 mm size.

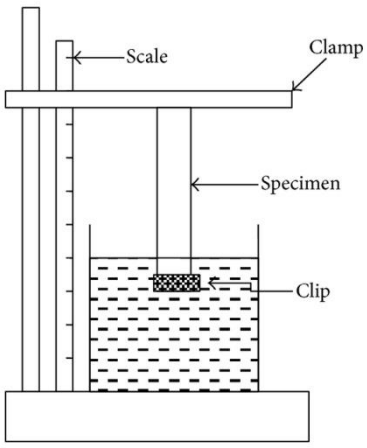


FIG. 14 VERTICAL WICKING APPARATUS

E-5.2 Fold each specimen end and secure it to the clamp using a clip.

E-5.3 Place the opening of a measuring glass beaker over the platform of vertical test apparatus below the clamp so that the specimen hangs in the beaker without touching the bottom.

E-5.4 Fill the bowl with distilled water and suspend the specimen in distilled water till its bottom end is immersed 20 mm in the water. In order to ensure that the bottom ends of the specimens could be immersed vertically at a depth of 20 mm into the water, clamp the bottom end of each specimen with a 3 g clip.

E-5.5 Leave the specimen for 30 min.

E-5.6 For kinetics of wicking height, distance traveled by water on vertical strip was measured for every minute for the first 5 min and then readings were taken after every 5 min for 30 min. After 30 min, measure the wicking height moved by water, starting 20 mm from the edge (the point which was the starting point for the wicking).

E-5.7 Repeat the test with the remaining test specimens.

E-6 RESULT

Measure the height of wicking for each test specimen and calculate the average height for all specimens for each lengthwise and widthwise direction.

ANNEX F
(*Clause* 6.5)

METHOD FOR DETERMINATION OF OBJECTIONABLE FAULTS IN POLYESTER SPUN YARN

F-1 INTRODUCTION

This test method covers classification and counting of faults in spun yarns using capacitance tester. This test method does not specify the criteria for determining protruding fibre or yarn hairiness or both.

F-2 PRINCIPLE

A specimen is passed through the sensing device of a classifying instrument at a constant speed. The electronic counting instrument records the faults and classifies them according to their length and relative diameter. The faults for the most part are in the form of thick places, thin places and neps in yarns spun on various spinning systems.

F-3 APPARATUS

F-3.1 Electronic Measuring Device

A capacitance or optical unit with guide alignment of the yarn in a straight path through the measuring zone.

F-3.2 Control Unit

A device that supplies the signal to operate the measuring device, and, also in turn receive the registration signal from the measuring device, stores the information received, responds to this information according to a predetermined setup and outputs computed data at the end of the test.

F-3.3 Winder

A power driven take-up device equipped with a winding drum of uniform diameter and capable of operating at constant take-up speed.

F-3.4 Yarn Tensioning Device

A unit for control of the yarn in the measuring zone so that the yarn travels in a straight path, free from kinks, without stretching the yarn.

F-4 CONDITIONING

F-4.1 The samples shall be allowed to condition at temperature of (27 ± 2) °C and a relative humidity of 65 percent ± 2 percent before carrying out the tests. All tests shall also be performed under standard conditions (*see* IS 6359).

F-5 PROCEDURE

F-5.1 Calibrate the testing instrument as prescribed by instrument manufacturer.

F-5.2 Make proper selections for material value, yarn numbers and the coding plug, if one is used. Review the tables provided by manufacturer for further details.

F-5.3 Set the take-up mechanism to the speed of 100 m/min. If a non-standard set-up is used it shall be reported.

NOTE — If agreed between the buyer and the seller, testing at different speeds shall be allowed.

F-5.3.1 Verify that control unit speed selection is set to the same speed as the take-up mechanism.

F-5.4 Check the package to ensure that no shipping material or other contaminant is present and that no damage is apparent on the package. If contaminants or damage are detected, select another package for testing.

NOTE — Do not separate the length of yarn from the packages prior to testing.

F-5.5 Mount the package on a suitable holder. Thread the free end of the yarn directly from the package through the instrument.

F-5.6 Start the take-up mechanism of the tester.

F-5.7 Test the total predetermined yarn length, that may require more than one package.

F-5.8 Follow the equipment manufacturer's instruction manual for operational procedures not outlined in this test method.

F-5.9 For equipment not equipped with automatic data calculations, weigh the yarn tested to the nearest 0.001 kg to determine the length.

F-6 CALCULATION

F-6.1 For testers not equipped with automatic data output, calculate the yarn faults and express in terms of yarn faults per 1 00 000 m using equation 1 or equation 2.

$$N_m \times \text{kg} \times 100\,000 = \text{m} \quad \ldots (1)$$

$$\frac{Counter\ reading \times 10\,000}{Tested\ length\ m} = \frac{Yarn\ faults}{100\,000\ m} \quad \ldots (2)$$

where

N_m = yarn number, metric count;
N_e = yarn number, English cotton count; and
kg = kilograms.

F-7 REPORT

F-7.1 State that the specimens were tested as directed in this test method. Describe the material or product sampled and the method of sampling used.

F-7.2 Report the following information:

a) Yarn number,
b) Type and model of tester,
c) Material setting of tester;
d) Yarn travel speed;
e) Length of specimen tested; and
f) Total yarn faults per 100 000 m or yd.

ANNEX G
(*Foreword*)

COMMITTEE COMPOSITION

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

Organization	*Representative(s)*
ICAR - Central Institute for Research on Cotton Technology, Mumbai	DR P. K. MANDHYAN **(*Chairperson*)**
Association of Synthetic Fibre Industries, New Delhi	SHRI M. S. VERMA
ATM Syntex, Dadra and Nagar Haveli	SHRI ARNAB SAMANTHA
Confederation of Indian Textile Industry, New Delhi	SHRIMATI CHANDRIMA CHATTERJEE SHRI ANMOL GUPTA (*Alternate*)
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Cotton Association of India, Mumbai	SHRI ATUL S. GANTARA SHRI VINAY N. KOTAK (*Alternate*)
Defence Materials and Stores Research and Development Establishment, Kanpur	SHRI ASHOK KUMAR YADAV SHRI BISWA RANJAN DAS (*Alternate*)
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Grasim Industries Limited, Vadodara	SHRIMATI SHAILLEY GARG SHRIMATI ASHMITA PANCHAL (*Alternate*)
ICAR - Central Institute for Research on Cotton Technology, Mumbai	DR SENTHIL KUMAR DR A. ARPUTHARAJ (*Alternate*)
JCT Limited, Phagwara	SHRI KHUSHWINDER SINGH DHILLON SHRI ARWINDER SINGH (*Alternate*)
North India Textile Mills Association, Chandigarh	SHRI SANJAY GARG SHRI SIDHARTHA KHANNA (*Alternate*)
Northern India Textile Research Association, Ghaziabad	SHRI SANJEEV SHUKLA
Office of Textile Commissioner, Mumbai	SHRI SOURABH KULKARNI SHRI PRANAV PARASHAR (*Alternate*)
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The Bombay Textile Research Association, Mumbai	SHRI R. A. SHAIKH SHRIMATI PRAGATI KULKARNI (*Alternate*)

Organization	*Representative(s)*
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The Cotton Textile Export Promotion Council, Mumbai	SHRI SIDDARTHA RAJGOPAL
The Southern India Mills Association, Coimbatore	DR K. SELVARAJU SHRI NAGARAJAN ESAKKIMUTHU (*Alternate*)
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In Personal Capacity (*36 Old Sneh Nagar, Wardha Road, Nagpur* - 440 015)	SHRI A. SATHEESAN
BIS Directorate General	SHRI J. K. GUPTA, SCIENTIST 'E'/ DIRECTOR AND HEAD (TEXTILES) [REPRESENTING DIRECTOR GENERAL (*Ex-officio*)]

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

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