भारतीय मानक मसौदा

वस्त्रादि — ग्रे कता सूती धागा — विशिष्टि
(*आई अस १७१ का पांचवा पुनरीक्षण*)

Draft *Indian Standard*

TEXTILES — GREY SPUN COTTON YARN — SPECIFICATIONS

(*Fifth revision of IS 171*)

ICS: 59.080.20

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

FOREWORD
(*Formal foreword to be added later*)

This standard was first published in 1951 and subsequently revised in 1964, 1973, 1985 and 2006. This standard is being revised again amalgamating the following standards on cotton spun yarn for better clarity:

a) IS 834 : 2006 Textiles – Ring spun grey cotton yarn for hosiery – Specification (fifth revision)
b) IS 13683 : 2006 Textiles – Ring spun grey cotton yarn – Specification (first revision)
c) IS 13684 : 2006 Textiles – Rotor spun grey cotton yarn – Specification (first revision)

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.

1 SCOPE

1.1 This standard specifies the requirements of grey cotton yarn made by following processes:
a) Ring Spinning
b) Rotor Spinning

1.2 This standard does not cover yarn produced from blends of cotton with man-made fibres or any other fibre.

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 standard.

3 TERMINOLOGY

For the purpose of this standard the following definitions shall apply.

3.1 Cotton Count (Ne) — The number of hanks (each measuring 768 m or yd) in 453.6 g (or 1lb).

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

CSP = Breaking load of a lea, in kg x cotton count (Ne) × 2.2046

3.3 Grey Cotton Yarn —Yarn as it leaves the spinning frame without any bleaching, dyeing or finishing treatment and in case of open-end yarn, it may have been waxed or not waxed.

3.4 Hairiness Index (H) — Total length of protruding fibres in the yarn in cm with reference to the sensing length of 1 cm yarn.

3.5 Lea — A continuous length of yarn measuring 109.73 m (120 yd) in the form of a coil having 80 wraps wound on a reel of 1.37 m (1.5 yd) girth.

3.6 Lea Breaking Load — The breaking load of a lea determined on a pendulum type testing machine, the rate of traverse being 300 ± 15 mm/min.

3.7 Ring Spun Yarn — Yarn spun on a system employing flat top cards and roller drafting assemblies with or without aprons on drawing, roving and ring frames.

3.8 Ring Spun Compact Yarn — Yarn made after ring spinning plus fiber compacting (The compact spinning is a process where fiber strand drawn by the drafting system is condensed before twisting it) The hairiness of the yarn is thus reduced, and the tenacity is higher when compared to regular ring-spun yarns. The yarn evenness is also improved.

3.9 Rotor Spun Yarn — Yarn spun on an open-end spinning machine wherein the individualization of fibres and assembling of fibres are done and the real twist is affected by a rotor.

3.10 Single Yarn Tenacity — Tensile stress of a single strand at rupture expressed as force per unit linear density of the unstrained specimen expressed usually as cN/tex (gf/tex).

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

3.12 Yarn Faults (Classimat) — The classimat yarn faults are tested by the Classimat System most commonly used in the mills. These are tested in classimat tester where the yarn passes through the sensors and the faults are expressed as number of faults per one lakh metre of yarn. This system works on the capacitance principle. Classimat faults shall be categorized as specified in **Annex C**.

4 REQUIREMENTS

4.0 The manufacturer shall declare the type of yarn being manufactured as follows based on the type of spinning process used:

a) Ring Spun Yarn
b) Rotor Spun Yarn

The manufacturer shall also declare the type of yarn being manufactured based on the application of the same as follows:

a) Carded Hosiery Yarn
b) Carded Weaving Yarn
c) Combed Hosiery Yarn
d) Combed Weaving Yarn
e) Combed Compact Hosiery Yarn
f) Combed Compact Weaving Yarn
g) Rotor Hosiery Yarn (WASTE Cotton)
h) Rotor Hosiery Yarn (VIRGIN Cotton)
i) Rotor Weaving Yarn (WASTE Cotton)
j) Rotor Weaving Yarn (VIRGIN Cotton)

4.1 Single Yarn (Ring Spun)

The single grey cotton carded or combed or combed compact yarn shall comply with the requirements given in Table 1, or Table 2, or Table 3, or Table 4, or Table 5 or Table 6. The average count of yarn shall be declared by the manufacturer and as agreed to between the buyer and the seller with a tolerance of ±2.0 percent permissible on the declared value, when tested as per the method prescribed in IS 1315.

Table 1 Ring Spun, Grey Cotton, Carded Single Yarn for Knitting
(*Clauses* 4.1 *and* 4.1.3)

S No.	Requirement	Count of Yarn							Method of Test, Ref To
		≥59 tex	(≥36.87 tex - <59 tex)	(≥29.5 tex - <36.87 tex)	(≥22.69 tex - <29.5 tex)	(≥19.67 tex - <22.69 tex)	(≥16.39 tex - <19.67 tex)	(≥14.75 tex - <16.39 tex)	
		(≤ 10s)	(>10s- ≤16s)	(>16s- ≤20s)	(>20s- ≤26s)	(>26s- ≤30s)	(>30s- ≤36s)	(>36s - ≤40s)	
i)	Count CV, percent, *Max*	1.2	1.2	1.3	1.4	1.5	1.6	1.7	IS 1315
ii)	Twist (tpm)	± 10% on the declared value as agreed between buyer and seller							IS 832 (Part 1)

iii)	CSP, *Min*	2000	2100	2200	2200	2300	2400	2400	IS 1671
iv)	Lea Breaking Load CV, percent, *Max*	5.50	5.50	5.50	6.00	6.00	6.50	6.50	IS 1670
v)	Yarn Tenacity cN/tex, *Min*	15.00	14.90	14.86	14.81	14.78	14.74	14.70	IS 1670
vi)	Yarn Tenacity CV, percent, *Max*	7.34	7.64	8.03	8.61	8.94	9.38	9.65	IS 1670
vii)	Breaking elongation percent, *Max*	6.54	6.24	6.06	5.83	5.71	5.55	5.47	IS 1670
viii)	Unevenness percent, *Max*	10.80	11.02	11.37	11.86	12.14	12.51	12.73	IS 16576
ix)	Unevenness CV percent, *Max*	13.50	13.77	14.21	14.83	15.18	15.64	15.91	
x)	Hairiness index, *Max*	8.8	7.9	7.4	6.8	6.5	6.2	6.0	Annex B of IS 17265
xi)	Imperfections/km, *Max*								IS 16576
	Thin	3	6	7	11	13	17	20	
	Thick	64	102	126	168	197	241	271	
	Neps	50	128	182	292	379	527	638	
	Total	117	236	315	471	589	785	929	
xii)	Objectional Faults, *max* (*See* Annex C)	18			25				Annex D

Table 2 Ring Spun, Grey Cotton, Carded Single Yarn for Weaving

(*Clauses* 4.1 *and* 4.1.3)

S No.	Requirements	Count of Yarn							Method of Test, Ref To
		≥59 tex	(≥36.87 tex - <59 tex)	(≥29.5 tex - <36.87 tex)	(≥22.69 tex - <29.5 tex)	(≥19.67 tex - <22.69 tex)	(≥16.39 tex - <19.67 tex)	(≥14.75 tex - <16.39 tex)	
		(≤ 10s)	(>10s-≤16s)	(>16s-≤20s)	(>20s-≤26s)	(>26s-≤30s)	(>30s-≤36s)	(>36s-≤40s)	
i)	Count CV, percent, *Max*	1.2	1.4	1.5	1.6	1.7	1.7	1.8	IS 1315
ii)	Twist (tpm)	± 10% on the declared value as agreed between buyer and seller							IS 832 (Part 1)
iii)	CSP, *Min*	2000	2100	2200	2200	2300	2400	2400	IS 1671
iv)	Lea Breaking Load CV, percent, *Max*	5.50	5.50	5.50	6.00	6.00	6.50	6.50	IS 1670

v)	Yarn Tenacity cN/tex, *Min*	16.81	16.62	16.55	16.45	16.4	16.33	16.29	IS 1670
vi)	Yarn Tenacity CV, percent, *Max*	7.43	8.28	8.63	9.14	9.43	9.80	10.03	IS 1670
vii)	Breaking elongation percent, *Max*	6.98	6.46	5.98	5.81	5.58	5.46	5.31	IS 1670
viii)	Unevenness percent, *Max*	10.88	11.78	12.15	12.67	12.96	13.34	13.57	IS 16576
ix)	Unevenness CV percent, *Max*	13.60	14.73	15.19	15.84	16.20	16.68	16.96	
x)	Hairiness index, *Max*	8.8	7.6	7.1	6.6	6.3	6.0	5.8	Annex B of IS 17265
xi)	Imperfections/km, *Max*								IS 16576
	Thin	2	5	8	13	17	24	29	
	Thick	68	116	142	188	219	266	298	
	Neps	57	139	196	314	405	560	676	
	Total	127	260	346	515	641	850	1003	
xii)	Objectional Faults, *max* (*See* Annex C)	11			34				Annex D

4.1.1 *Yarn Appearance (Optional)*

The average black board appearance (5 boards) shall be at least of Grade B as specified in IS 13260. In case of yarn counts coarser than 98 tex (6s) this shall be as agreed to between the buyer and the seller.

4.1.2 *Freedom from Defects* — The yarn shall be free from defects listed in Annex B.

4.1.3 If required by the buyer, the spun yarns shall meet the requirement of objectionable faults as specified in Table 1, 2, 3, 4, 5 or 6 when tested with the method given in Annex D with classification of Classimat System given in Annex C.

The sum of total number of objectionable faults, i.e., A3, A4, B3, B4, C2, C3, C4, D2, D3 and D4 shall not exceed the limit specified in each table (*See* Table 1, 2, 3, 4, 5, or 6) for each type of yarn.

4.1.4 *Moisture Regain*

Unless otherwise agreed to between the buyer and the seller, the moisture regain shall not exceed 8.5 percent. It shall be determined by the method given in Annex E.

Table 3 Ring Spun, Grey Cotton, Combed Single Yarn for Knitting
(*Clauses* 4.1 *and* 4.1.3)

S No.	Requirement	Count of Yarn										Method of Test, Ref To
		≥59 tex (≤ 10s)	36.9-53.7 tex (10s-16s)	29.5-34.7 tex (17s-20s)	20.3-28.1 tex (21s-29s)	15.1 – 19.7 tex (30s-39s)	10.9 – 14.8 tex (40s-54s)	7.9-10.7 tex (55s-74s)	7.8-6.6 tex (75s-90s)	6.6 - 5.6 tex (90s-105s)	5.6 - 4.9 tex (105s-120s)	
i)	Count CV, percent, *Max*	1.30	1.30	1.30	1.30	1.40	1.40	1.40	1.50	1.60	1.60	IS 1315
ii)	Twist (tpm)	± 10% on the declared value as agreed between buyer and seller										IS 832 (Part 1)
iii)	CSP, *Min*	2300	2400	2400	2500	2500	2600	2600	2700	2700	2800	IS 1671
iv)	Lea Breaking Load CV, percent, *Max*	5.50	5.50	5.50	5.50	6.00	6.00	6.00	6.00	6.50	6.50	IS 1670
v)	Yarn Tenacity cN/tex, *Min*	14.50	15.00	15.50	16.00	16.50	17.00	17.71	18.89	19.46	19.95	IS 1670
vi)	Yarn Tenacity CV, percent, *Max*	8.50	8.50	8.50	9.00	9.00	9.50	9.50	10.00	10.00	10.50	IS 1670
vii)	Breaking elongation percent, *Max*	5.30	5.27	5.25	5.17	5.07	4.93	4.83	4.79	4.74	4.70	IS 1670
viii)	Unevenness percent, *Max*	8.32	8.48	8.81	9.48	9.98	10.73	11.30	11.54	11.86	12.15	IS 16576
ix)	Unevenness CV percent, *Max*	10.40	10.60	11.01	11.85	12.47	13.41	14.12	14.43	14.83	15.19	
x)	Hairiness index, *Max*	6.50	6.00	5.70	5.50	5.00	4.50	4.00	3.50	3.00	2.50	Annex B of IS 17265
xi)	Imperfections/ km, *Max*											IS 16576
	Thin	0.00	0.00	0.00	0.00	1.00	5.00	15.00	26.00	39.00	55.00	
	Thick	5.00	8.00	10.00	18.00	26.00	45.00	66.00	76.00	90.00	105.00	
	Neps	7.00	17.00	20.00	32.00	50.00	72.00	93.00	104.00	119.00	134.00	
	Total	12.00	25.00	30.00	50.00	77.00	122.00	174.00	206.00	248.00	294.00	

xii)	Objectional Faults, *max*	10	13	15	Annex C and Annex D

Table 4 Ring Spun, Grey Cotton, Combed Single Yarn for Weaving

(*Clauses* 4.1 *and* 4.1.3)

S No.	Requirement	Count of Yarn										Method of Test, Ref To
		≥59 tex (≤ 10s)	36.9-53.7 tex (10s-16s)	29.5-34.7 tex (17s-20s)	20.3-28.1 tex (21s-29s)	15.1 – 19.7 tex (30s-39s)	10.9 – 14.8 tex (40s-54s)	7.9 - 10.7 tex (55s-74s)	7.8-6.6 tex (75s - 90s)	6.6 - 5.6 tex (90s-105s)	5.6 - 4.9 tex (105s-120s)	
i)	Count CV, percent, *Max*	1.30	1.30	1.30	1.30	1.40	1.40	1.40	1.50	1.60	1.60	IS 1315
ii)	Twist (tpm)	± 10% on the declared value as agreed between buyer and seller										IS 832 (Part 1)
iii)	CSP, *Min*	2300	2400	2400	2500	2500	2600	2600	2700.00	2700.00	2800.00	IS 1671
iv)	Lea Breaking Load CV, percent, *Max*	5.50	5.50	5.50	5.50	6.00	6.00	6.00	6.00	6.50	6.50	IS 1670
v)	Yarn Tenacity cN/tex, *Min*	14.50	15.00	15.50	16.00	16.50	17.00	17.71	18.89	19.46	19.95	IS 1670
vi)	Yarn Tenacity CV, percent, *Max*	8.50	8.50	8.50	9.00	9.00	9.50	9.50	10.00	10.00	10.50	IS 1670
vii)	Breaking elongation percent, *Max*			5.00	5.17	5.07	4.93	4.83	4.79	4.74	4.70	IS 1670
viii)	Unevenness percent, *Max*	8.50	8.81	9.16	9.48	9.98	10.73	11.30	11.54	11.86	12.15	IS 16576
ix)	Unevenness CV percent, *Max*	10.63	11.01	11.45	11.85	12.47	13.41	14.12	14.43	14.83	15.19	
x)	Hairiness index, *Max*	6.00	5.80	5.50	5.00	4.70	4.20	3.30	2.90	2.60	2.40	Annex B of IS 17265
xi)	Imperfections/km, *Max*											IS 16576

	Thin	0.00	0.00	0.00	0.00	1.00	5.00	15.00	26.00	39.00	55.00	
	Thick	5.00	8.00	10.00	18.00	26.00	45.00	66.00	76.00	90.00	105.00	
	Neps	7.00	17.00	20.00	32.00	50.00	72.00	93.00	104.00	119.00	134.00	
	Total	12.00	25.00	30.00	50.00	77.00	122.00	174.00	206.00	248.00	294.00	
xii)	Objectional Faults, *max*	9.5			13			58				Annex C and Annex D

Table 5 Ring Spun, Grey Cotton, Combed Compact Single Yarn for Knitting

(*Clauses* 4.1 *and* 4.1.3)

S No.	Requirement	Count of Yarn										Method of Test, Ref To
		≥59 tex (≤ 10s)	36.9 - 53.7 tex (10s - 16s)	29.5 - 34.7 tex (17s - 20s)	20.3 - 28.1 tex (21s - 29s)	15.1 – 19.7 tex (30s - 39s)	10.9 – 14.8 tex (40s - 54s)	7.9-10.7 tex (55s - 74s)	7.8-6.6 tex (75s - 90s)	6.6 - 5.6 tex (90s-105s)	5.6 - 4.9 tex (105s-120s)	
i)	Count CV, percent, *Max*	1.30	1.30	1.30	1.30	1.40	1.40	1.40	1.50	1.60	1.60	IS 1315
ii)	Twist (tpm)	±10% on the declared value as agreed between buyer and seller										IS 832 (Part 1)
iii)	CSP, *Min*	23000	24000	24000	25000	25000	26000	26000	27000	2700.00	2800.00	IS 1671
iv)	Lea Breaking Load CV, percent, *Max*	5.50	5.50	5.50	5.50	6.00	6.00	6.00	6.00	6.50	6.50	IS 1670
v)	Yarn Tenacity cN/tex, *Min*	14.50	15.00	15.50	16.00	16.50	17.00	17.71	18.89	19.46	19.95	IS 1670
vi)	Yarn Tenacity CV, percent, *Max*	8.50	8.50	8.50	9.00	9.00	9.50	9.50	10.00	10.00	10.50	IS 1670
vii)	Breaking elongation percent, *Max*			5.00	5.17	5.07	4.93	4.83	4.79	4.74	4.70	IS 1670
viii)	Unevenness percent, *Max*	8.20	8.35	8.63	8.98	9.46	10.16	10.70	10.92	11.23	11.50	IS 16576
ix)	Unevenness CV percent, *Max*	10.25	10.44	10.79	11.22	11.82	12.70	13.37	13.65	14.04	14.37	

x)	Hairiness index, *Max*	6.00	5.80	5.50	5.00	4.70	4.20	3.30	2.90	2.60	2.40	Annex B of IS 17265
xi)	Imperfections/km, *Max*											IS 16576
	Thin	0.00	0.00	0.00	0.00	1.00	4.00	9.00	13.00	20.00	28.00	
	Thick	4.00	6.00	7.00	12.00	17.00	27.00	38.00	43.00	52.00	61.00	
	Neps	7.00	12.00	15.00	23.00	29.00	43.00	56.00	62.00	72.00	82.00	
	Total	11.00	18.00	22.00	35.00	47.00	74.00	103.00	118.00	144.00	171.00	
xii)	Objectional Faults, *max*	7.5			11			55				Annex C and Annex D

Table 6 Ring Spun, Grey Cotton, Combed Compact Single Yarn for Weaving

(*Clauses* 4.1 *and* 4.1.3)

SNo.	Requirement	Count of Yarn										Method of Test, Ref To
		≥59 tex (≤ 10s)	36.9-53.7 tex (10s-16s)	29.5-34.7 tex (17s-20s)	20.3-28.1 tex (21s-29s)	15.1 – 19.7 tex (30s-39s)	10.9 – 14.8 tex (40s-54s)	7.9-10.7 tex (55s-74s)	7.8-6.6 tex (75s-90s)	6.6 - 5.6 tex (90s-105s)	5.6 - 4.9 tex (105s - 120s)	
i)	Count CV, percent, *Max*	1.10	1.10	1.10	1.20	1.30	1.30	1.40	1.50	1.60	1.60	IS 1315
ii)	Twist (tpm)	±10% on the declared value as agreed between buyer and seller										IS 832 (Part 1)
iii)	CSP, *Min*	2300.00	2400.00	2400.00	2500.00	2500.00	2600.00	2600.00	2700.00	2700.00	2800.00	IS 1671
iv)	Lea Breaking Load CV, percent, *Max*	5.50	5.50	5.50	5.50	6.00	6.00	6.00	6.50	6.50	6.50	IS 1670
v)	Yarn Tenacity cN/tex, *Min*	14.50	15.00	18.24	18.84	19.52	20.48	21.25	22.48	23.45	24.06	IS 1670

vi)	Yarn Tenacity CV, percent, *Max*	8.50	8.50	8.50	9.00	9.00	9.50	9.50	10.00	10.00	10.50	IS 1670
vii)	Breaking elongation percent, *Max*			6.17	5.78	5.51	5.16	4.92	4.83	4.71	4.60	IS 1670
viii)	Unevenness percent, *Max*	8.32	8.40	8.58	9.48	9.77	10.54	11.13	11.38	11.71	12.01	IS 16576
ix)	Unevenness CV percent, *Max*	10.40	10.50	10.72	11.85	12.21	13.18	13.91	14.22	14.64	15.01	
x)	Hairiness index, *Max*	6.00	5.80	5.50	5.00	4.70	4.20	3.30	2.90	2.60	2.40	Annex B of IS 17265
xi)	Imperfections/km, *Max*											IS 16576
	Thin	0.00	0.00	0.00	0.00	1.00	5.00	14.00	21.00	34.00	53.00	
	Thick	5.00	8.00	10.00	18.00	26.00	45.00	66.00	76.00	90.00	105.00	
	Neps	7.00	17.00	20.00	32.00	50.00	72.00	93.00	104.00	119.00	134.00	
	Total	12.00	25.00	30.00	50.00	77.00	122.00	173.00	201.00	243.00	292.00	
xii)	Objectional Faults, *max*	7.5			11			55				Annex C and Annex D

4.2 Rotor Spun Yarn (Single Yarn)

4.2.1 The rotor spun grey cotton yarn shall comply with the requirements given in Table 7 or 8 or 9 or 10. However, the average count of the yarn shall be as agreed to between the buyer and the seller with a tolerance of ±3.0 percent permissible on the count of yarn when determined as per the method prescribed in IS 1315.

4.2.2 The hairiness requirement for waste cotton rotor spun yarn shall be as agreed between buyer and seller.

4.2.3 The clauses mentioned from **4.1.1** to **4.1.4** shall also be applicable to the rotor spun yarn (excluding **4.1.3**)

Table 7 Rotor Spun Grey Cotton Yarn (Waste Cotton) for Knitting
(*Clause* 4.2)

S No.	**Requirement**	**Count of Yarn**	

		≥118 tex	59.0-98.4 tex	36.9-53.7 tex	29.5-34.7 tex	28.1-23.6 tex	22.7-19.7 tex	19.0-16.8 tex	16.4-14.7 tex	Method of Test, Ref To
		(≤ 5s)	(6s-10s)	(11s-16s)	(17s-20s)	(21s - 25s)	(26s - 30s)	(31s - 35s)	(36s - 40s)	
i)	Count CV, percent, *Max*	2.0	2.1	2.2	2.3	2.4	2.4	2.5	2.5	IS 1315
ii)	Twist (tpm)	± 10% on the declared value as agreed between buyer and seller								IS 832 (Part 1)
iii)	CSP, *Min*	1800	1750	1700	1700	1650	1650	1600	1600	IS 1671
iv)	Lea Breaking Load CV, percent, *Max*	5.0	5.5	5.5	6.0	6.0	6.5	6.5	7.0	IS 1670
v)	Yarn Tenacity cN/tex, *Min*	9.30	9.24	9.14	9.11	9.06	9.03	9.00	8.98	IS 1670
vi)	Yarn Tenacity CV, percent, *Max*	8.07	8.68	9.60	9.99	10.53	10.84	11.25	11.49	IS 1670
vii)	Breaking elongation percent, *Max*	5.04	4.77	4.41	4.28	4.11	4.02	3.91	3.85	IS 1670
viii)	Unevenness percent, *Max*	11.94	12.40	13.08	13.35	13.73	13.94	14.21	14.37	IS 16576
ix)	Unevenness CV percent, *Max*	14.93	15.50	16.35	16.69	17.16	17.42	17.76	17.96	
x)	Hairiness index, *Max*	8.7	8.5	8.1	7.6	7.1	6.8	6.5	6.3	Annex B of IS 17265
xi)	Imperfections/km, *Max*									IS 16576
	Thin	12	21	46	61	91	113	149	175	
	Thick	74	106	174	211	274	315	378	420	
	Neps	18	28	54	70	98	118	150	173	
	Total	104	155	274	342	463	546	677	768	

Table 8 Rotor Spun Grey Cotton Yarn (Waste Cotton) for Weaving

(*Clause* 4.2)

S No.	Requirement	Count of Yarn								Method of Test, Ref To
		≥118 tex	59.0-98.4 tex	36.9-53.7 tex	29.5-34.7 tex	28.1-23.6 tex	22.7-19.7 tex	19.0-16.8 tex	16.4-14.7 tex	
		(≤ 5s)	(6s-10s)	(11s-16s)	(17s-20s)	(21s - 25s)	(26s - 30s)	(31s - 35s)	(36s - 40s)	
i)	Count CV, percent, *Max*	2.1	2.2	2.3	2.3	2.3	2.4	2.4	2.4	IS 1315
ii)	Twist (tpm)	± 10% on the declared value as agreed between buyer and seller								IS 832 (Part 1)
iii)	CSP, *Min*	1800	1750	1700	1700	1650	1650	1600	1600	IS 1671
iv)	Lea Breaking Load CV, percent, *Max*	5	5.5	5.5	6	6	6.5	6.5	7	IS 1670
v)	Yarn Tenacity cN/tex, *Min*	11.62	11.03	10.62	10.47	10.26	10.15	10.01	9.93	IS 1670
vi)	Yarn Tenacity CV, percent, *Max*	7.66	8.78	9.69	10.07	10.60	10.91	11.30	11.54	IS 1670
vii)	Breaking elongation percent, *Max*	6.65	5.86	5.34	5.16	4.91	4.79	4.63	4.54	IS 1670
viii)	Unevenness percent, *Max*	10.95	11.78	12.42	12.68	13.04	13.24	13.50	13.65	IS 16576
ix)	Unevenness CV percent, *Max*	13.69	14.73	15.53	15.85	16.30	16.55	16.87	17.06	
x)	Hairiness index, *Max*	9.8	9.2	8.2	6.8	6.4	5.8	5.5	5.2	Annex B of IS 17265
xi)	Imperfections/km, *Max*									IS 16576
	Thin	2	8	22	32	54	71	102	126	
	Thick	38	70	107	127	159	180	210	230	
	Neps	8	27	67	95	154	199	278	337	
	Total	48	105	196	254	367	450	590	693	

Table 9 Rotor Spun Grey Cotton Yarn (Virgin Cotton) for Knitting

(*Clause* 4.2)

S No.	Requirement	Count of Yarn								Method of Test, Ref To
		≥118 tex	**59.0-98.4 tex**	**36.9-53.7 tex**	**29.5-34.7 tex**	**28.1-23.6 tex**	**22.7-19.7 tex**	**19.0-16.8 tex**	**16.4-14.7 tex**	
		(≤ 5s)	**(6s-10s)**	**(11s-16s)**	**(17s-20s)**	**(21s - 25s)**	**(26s - 30s)**	**(31s - 35s)**	**(36s - 40s)**	
i)	Count CV, percent, *Max*	1.4	1.5	1.6	1.7	1.7	1.8	1.8	1.9	IS 1315
ii)	CSP, *Min*	1800	1750	1700	1700	1650	1650	1600	1600	IS 1671
iii)	Lea Breaking Load CV, percent, *Max*	5.0	5.5	5.5	6.0	6.0	6.5	6.5	7.0	IS 1670
iv)	Yarn Tenacity cN/tex, *Min*	9.30	9.24	9.14	9.11	9.06	9.03	9.00	8.98	IS 1670
v)	Yarn Tenacity CV, percent, *Max*	8.07	8.68	9.60	9.99	10.53	10.84	11.25	11.49	IS 1670
vi)	Breaking elongation percent, *Max*	5.91	5.59	5.17	5.02	4.82	4.71	4.58	4.51	IS 1670
vii)	Unevenness percent, *Max*	11.26	11.70	12.34	12.59	12.94	13.14	13.40	13.55	IS 16576
viii)	Unevenness CV percent, *Max*	14.08	14.62	15.42	15.74	16.18	16.43	16.75	16.94	
ix)	Hairiness index, *Max*	7.7	7.1	6.5	6.2	5.9	5.7	5.5	5.4	Annex B of IS 17265
x)	Imperfections/km, *Max*									IS 16576
	Thin	6	10	23	31	47	59	78	93	
	Thick	41	61	106	131	174	204	249	280	
	Neps	8	13	27	35	51	62	80	93	
	Total	55	84	156	197	272	325	407	466	

Table 10 Rotor Spun Grey Cotton Yarn (Virgin Cotton) for Weaving

(*Clause* 4.2)

S No.	Requirement	Count of Yarn								Method of Test, Ref To
		≥118 tex	**59.0-98.4 tex**	**36.9-53.7 tex**	**29.5-34.7 tex**	**28.1-23.6 tex**	**22.7-19.7 tex**	**19.0-16.8 tex**	**16.4-14.7 tex**	
		(≤ 5s)	**(6s-10s)**	**(11s-16s)**	**(17s-20s)**	**(21s - 25s)**	**(26s - 30s)**	**(31s - 35s)**	**(36s - 40s)**	
i)	Count CV, percent, *Max*	1	1	1.1	1.1	1.2	1.2	1.2	1.2	IS 1315
ii)	CSP, *Min*	1800	1750	1700	1700	1650	1650	1600	1600	IS 1671
iii)	Lea Breaking Load CV, percent, *Max*	5	5.5	5.5	6	6	6.5	6.5	7	IS 1670
iv)	Yarn Tenacity cN/tex, *Min*	13.53	12.92	12.50	12.34	12.13	12.01	11.87	11.78	IS 1670
v)	Yarn Tenacity CV, percent, *Max*	5.56	6.58	7.42	7.78	8.28	8.58	8.96	9.19	IS 1670
vi)	Breaking elongation percent, *Max*	7.96	7.09	6.52	6.31	6.04	5.90	5.72	5.62	IS 1670
vii)	Unevenness, percent, *Max*	9.72	10.53	11.16	11.42	11.77	11.96	12.22	12.37	IS 16576
viii)	Unevenness CV, percent, *Max*	12.15	13.16	13.95	14.27	14.71	14.95	15.27	15.46	
ix)	Hairiness index, *Max*	8.4	6.4	5.3	4.9	4.4	4.2	3.9	3.7	Annex B of IS 17265
x)	Imperfections/km, *Max*									IS 16576
	Thin	0	2	5	8	14	19	28	35	
	Thick	10	22	37	46	61	71	87	98	
	Neps	2	7	18	26	43	56	80	99	
	Total	12	31	60	80	118	146	195	232	

4.3 Two-Fold Yarn (Doubled Yarn) (*For Ring spun Yarn only*)"

4.3.1 The single yarn used for producing two-fold yarn shall satisfy the requirements specified in **4.1**.

4.3.2 The average resultant count of the two-fold yarn shall be as agreed to between the buyer and the seller. However, a tolerance of ±3 percent shall be permissible on the average resultant count. The resultant count shall be determined as per the method prescribed in IS 1315.

4.3.3 The ply twist in the two-fold yam shall be as agreed to between the buyer and the seller, and the average ply twist shall be within ±5 percent of the specified value. The twist shall be determined by method prescribed in IS 832.

4.3.4 The yarn quality improvement due to doubling when compared to the single yarn quality parameters would be as given in Table 11. The lea breaking load of two-fold yarn shall be determined by the method prescribed in IS 1671; and the single yarn strength shall be tested by method prescribed in IS 1670. The imperfections shall be tested as per IS 16576 and objectional faults shall be tested as per Annex C and Annex D.

Table 11 Yarn Quality Improvement Due to Doubling
(*Clause* 4.3.4)

Sl No.	Quality Parameters	Single Yarn Count	Extent of Improvement, Percent
(1)	(2)	(3)	(4)
i)	Lea CSP, *Min*	29.5-14.7 tex(20s-40s) 14.7-9.8 tex (40s-60s) 9.8 tex (60s) and finer	10 12 15
ii)	Lea Count CV (percent)	All Counts	0.5 [1)]
iii)	Lea strength CV (percent)	All Counts	1.0 [1)]
iv)	Single yarn strength CV (percent)	All Counts	20
v)	Total imperfections	>9.8 tex (<60s) 9.8 tex (60s) and finer	90 75
vi)	Classimat objectionable faults	All Counts	75

NOTES

1 Percent improvement is in relation to the level of yarn quality at single yarn stage.

2 The strength improvement depends upon the direction and amount of doubling twist.

[1)] Absolute values.

5 MARKING

5.1 Each cone or cheese of yarn shall be marked with the following:

a) Count of yarn, followed by;
b) In case of ring spun yarns, the cones shall mention the letters representing process and application consecutively (*see* Table 12)
c) In case of rotor spun yarn, the cones or cheeses shall mention letters representing process and application consecutively as below:

OE Hosiery

or

OE Weaving"

d) The words '100 Percent Cotton' *or* '100% Cotton' are to be mandatorily mentioned.
e) Net mass of yarn in package;
f) Indication of the source of manufacture; and
g) Any other information required by the buyer or by the law in force.

5.2 Each case containing cones or cheeses shall be marked with the following:

a) Count of yarn;
b) In case of ring spun yarn follow 6.1 (b)
c) In case of rotor spun yarn follow 6.1 (c)
d) The words '100 Percent Cotton' *or* '100% Cotton' are to be mandatorily mentioned.
e) Gross mass of bale or case;
f) Net mass of bale or case;
g) Indication of the source of manufacture; and
h) Any other information required by the buyer or by the law in force.

Table 12

[*Clause* 5.1 (b) and 5.2 (b)]

S No.	Initials	Meaning
1	KH	Carded Hosiery
2	KW	Carded Weaving
3	CH	Combed Hosiery
4	CCH	Combed Compact Hosiery
5	CW	Combed Weaving
6	CCW	Combed Compact Weaving

5.3 BIS Certification Marking

The cone/cheese of yarn and case containing cones/ cheese may also be marked with BIS Standard Mark.

5.3.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations made thereunder. The details of conditions under which the license for the use of the Standard Mark maybe granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

6 PACKING

Unless otherwise agreed to between the buyer and the seller, the yam shall be packed in accordance with the procedure laid down in anyone of the Indian Standards given below:

a) IS 293

b) IS 1347

c) IS 3086

d) IS 3325

7 SAMPLING

7.1 Lot

In any consignment, the cases containing yam of the same type and of the same nominal count shall constitute a lot.

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

7.3 Unless otherwise agreed to between the buyer and the seller, the number of cases to be selected from a lot shall be in accordance with Table 13. The bales or cases shall be selected at random, and in order to ensure the randomness of selection, guidance may be obtained from IS 4905.

Table 13 Sampling
(*Clause* 7.3)

Sl No.	Lot Size	Sample Size
(1)	(2)	(3)
i)	Up to 3	1
ii)	4-10	2
iii)	11-30	3
iv)	31-50	5
v)	Over 50	8

7.4 In case two or less bales or cases are selected in the sample, at least 10 cones or cheeses shall be drawn at random from each of the selected bale or case. However, in case three or more bales or cases are selected in the sample, at least five cones or cheeses shall be drawn at random from each of the selected bale or case. The number of leas to be prepared from each cone or cheese shall not be greater than 5. As far as possible, equal number of leas shall be

prepared from each of the selected cone or cheese. The number of leas so prepared from the lot shall be equal to 30.

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

7.5 Criteria for Conformity

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

a) The average count calculated from the test results lies within the tolerances specified and the coefficient of variation for the count is less than those specified values.
b) The count lea strength product or tenacity, as the case may be, is greater than or equal to the minimum specified values, and the coefficient of variation is less than the specified values.
c) All the test specimens examined for defects, appearance, evenness, twist, moisture, hairiness index shall satisfy the relevant requirements.

ANNEX A
(*Clause* 2)

LIST OF REFERRED STANDARDS

IS No.	*Title*
IS 199:1989	Textiles — Estimation of moisture, total size or finish, ash and fatty matter in grey and finished cotton textile materials (*third revision*)
IS 293:1980	Code for seaworthy packaging of cotton yarn and cloth (*third revision*)
IS 832:1985	Methods for determination of twist in yam (*first revision*)
IS 1315: 1977	Method for determination of linear density of yarns spun on cotton system (*first revision*)
IS 1347: 1972	Specification for inland packaging of cotton cloth and yarn (*first revision*)
IS 1670: 1991	Textiles — Yarn — Determination of breaking load and elongation at break of single strand (*second revision*)
IS 1671: 1977	Method for determination of yarn strength parameters of yarns spun on cotton system (*first revision*)
IS 3086: 1965	Code for seaworthy packaging of cotton hosiery yarn and goods

IS 3325: 1965	Code for inland packaging of cotton hosiery yarn and goods
IS 4905: 2015	Random sampling and randomization procedures (*first revision*)
IS 13260: 1993	Method of grading for appearance of cotton yarn using photographic standards

ANNEX B

(*Clause* 4.1.2)

COMMON DEFECTS OF YARN ON CONES AND HANKS

B-1 COMMON DEFECTS OF YARN ON CONES

a) Stitches of more than 2,5 cm in length at the base,
b) Excessive stitches at the nose,
c) Soft cones,
d) Hard Genes,
e) Collapsed cones,
f) Prominent stains inclusive of chalk and other markings,
g) Cut threads,
h) Absence of tail-end where it is required the length of the tail-end should not be less than 30 cm,
j) Ribbon formation,
k) Drum cuts,
m) Shade variation, and
n) Count mix up

B-2 COMMON DEFECTS OF YARN ON HANKS

a) Improper leasing;
b) Nose and tail-end not tied with tie yam;
c) Entanglement;
d) Presence of many knots with long tail-ends;
e) Presence of hard waste;
f) Excessive presence of twist lessness, irregular twist or cork screw effects in case of plied yarns; and
g) Plying of wrong counts.

ANNEX C

(*Clause* 4.1.3)

CLASSIFICATION AND CATEGORIZATION OF CLASSIMAT FAULTS

C-1 The classimat fault shall be classified as short thick, long thick or long thin as per the scheme given in Table 16 (*see* also Fig. 1).

C-2 OBJECTIONAL FAULTS

Faults in the category A_3, A_4, B_3, B_4, C_2, C_3, C_4, D_2, D_3 and D_4 shall be considered as objectional faults.

Table 16 Classification of Classimat Faults

Sl. No.	Fault	Fault Length cm	Cross Sectional increase, Percent, Fault	Type of Fault
(1)	(2)	(3)	(4)	(5)
i)	A_1	0.1-1	100-150	Short Thick
ii)	A_2	0.1-1	150-250	Short Thick
iii)	A_3	0.1-1	250-400	Short Thick
iv)	A_4	0.1-1	Above 400	Short Thick
v)	B_1	1-2	100-150	Short Thick
vi)	B_2	1-2	150-250	Short Thick
vii)	B_3	1-2	250-400	Short Thick
viii)	B_4	1-2	Above 400	Short Thick
ix)	C_1	2-4	100-150	Short Thick
x)	C_2	2-4	150-250	Short Thick
xi)	C_3	2-4	250-400	Short Thick
xii)	C_4	2-4	Above 400	Short Thick
xiii)	D_1	4-8	100-150	Short Thick
xiv)	D_2	4-8	150-250	Short Thick
xv)	D_3	4-8	250-400	Short Thick
xvi)	D_4	4-8	Above 400	Short Thick
xvii)	E	8-3	100-150	Long Thick
xviii)	F	8-3	45-100	Long Thick
xix)	G	Above 32	45-100	Long Thick
xx)	H_1	8-32	-30 - -45	Long Thick
xxi)	H_2	8-32	-45 - -75	Long Thick
xxii)	I_1	Above 32	-30 - -45	Long Thick

xxiii)	I_2	Above 32	-45 - -75	Long Thick

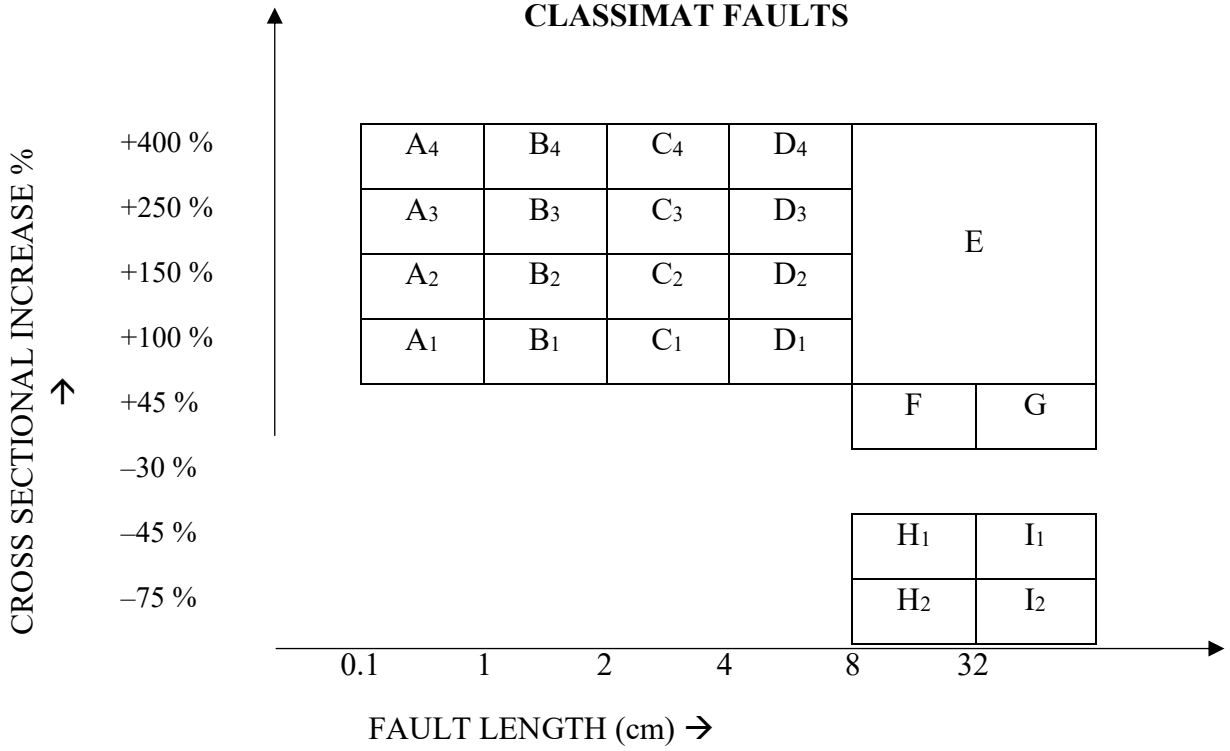

FIG. 1 CLASSIMAT SYSTEM

ANNEX D
(*Clause* 4.1.3)

METHOD FOR DETERMINATION OF OBJECTIONABLE FAULTS IN COTTON SPUN YARN

D-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.

D-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.

D-3 APPARATUS

D-3.1 Electronic Measuring Device

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

D-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.

D-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.

D-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.

D-4 CONDITIONING

D-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).

D-5 PROCEDURE

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

D-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.

D-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.

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

D-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.

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

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

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

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

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

D-6 CALCULATION

D-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.

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

$$\frac{Counter\ reading\ x\ 10\,000}{Tested\ length\ (m)} = \frac{Yarn\ Faults}{100\,000\ m} \qquad \ldots (2)$$

Where:
Nm = yarn number, metric count;
Ne = yarn number, English cotton count; and
kg = kilograms.

D-7 REPORT

D-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.

D-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 E
(*Clause* 4.1.4)

METHOD FOR DETERMINATION OF MOISTURE REGAIN

E-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.

E-2 APPARATUS

E-2.1 Precision Balance

E-2.2 Stainless Steel Vessels

E-2.3 Forceps

E-2.4 Hot Air Oven — Capable of maintaining at (110 ± 5) °C.

E-2.5 Wrap Reel

E-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).

E-4 PROCEDURE

Weigh the yarn skein before the test (*W1*) 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 (*W2*) is obtained. Calculate the moisture content using the relations:

$W = W1 - W2$ ... (1)

$$Moisture\ Content = \frac{100\ x\ W}{W1}$$

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

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