

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS

Draft for comments only

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भारतीय मानक मसौदा

वस्त्रादि — पैराशूट के लिए हल्के वजन का नायलॉन कपड़ा — विशिष्टि

Draft Indian Standard

**TEXTILES — LIGHT WEIGHT NYLON FABRICS FOR PARACHUTES
— SPECIFICATION**

ICS : 59.080.30

Textile Materials for Aeronautical Applications
Sectional Committee, TXD 13

Last date for receipt of comments is
11 October 2024

FOREWORD

(Formal clauses will be added later)

This standard was first published in 1968 and subsequently revised in 1984. This revision has been made in the light of experience gained since its last revision and to incorporate the following major changes:

- a) New varieties of light weight nylon fabrics for parachutes have been incorporated;
- b) Weave design for each variety has been incorporated;
- c) Packing and marking clauses have been updated; and
- d) References to Indian Standards have been updated.

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

This standard specifies the requirements of light weight nylon fabrics used for the fabrication of parachutes intended for personnel, brake parachute and other aerial delivery purposes.

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 MANUFACTURE

3.1 Yarn

The yarn used in the manufacture of the fabric shall be of high tenacity, multi-filament, bright, nylon 6 6 for all varieties. The melting point of yarn used in the manufacture of the fabric shall not be less than 244 °C

NOTE — The tenacity of yarn may be as stated in the contract or the order if so as desired by the purchaser.

3.2 Twist

Any suitable yarn twist (warp and weft) may be used as agreed to between buyer and the seller, provided nylon fabric shall meet the requirements as specified in Table 1. Based on the combination of weave, different varieties of nylon fabric are mentioned as below.

<i>Sl No.</i>	<i>Variety type</i>	<i>Weave</i>	<i>Ref Weave design</i>
(1)	(2)	(3)	(4)
i)	Variety 1	Rip Stop 1/1 Plain with 2 warp and 2 weft in one shed	Figure 1
ii)	Variety 2	1/1 Plain Weave	Figure 2
iii)	Variety 3	Rip Stop 1/1 Plain with 2 warp and 2 weft in one shed	Figure 3
iv)	Variety 4	Rip Stop 1/1 Plain Weave	Figure 4 (a) or 4 (b)
v)	Variety 5	2/1 Twill Weave	Figure 5
vi)	Variety 6	Rip Stop 1/1 Plain Weave, Low Porosity	Figure 6 (a) or figure 6 (b)
vii)	Variety 7	Rip Stop 1/1 Plain Weave	Figure 7
viii)	Variety 8	Rip Stop 1/1 Plain Weave	Figure 4 (a) or 4 (b)
ix)	Variety 9	6×6 Huckaback Weave	Figure 8
x)	Variety 10	6×6 Huckaback Weave	Figure 9
xi)	Variety 11	1/1 Plain Weave	Figure 2
xii)	Variety 12	6×6 Mock leno Weave	Figure 10
xiii)	Variety 13	2/1 Twill Weave	Figure 5

xiv)	Variety 14	8×8 Mock leno Weave	Figure 11
xv)	Variety 15	6×6 Huckaback Weave	Figure 9

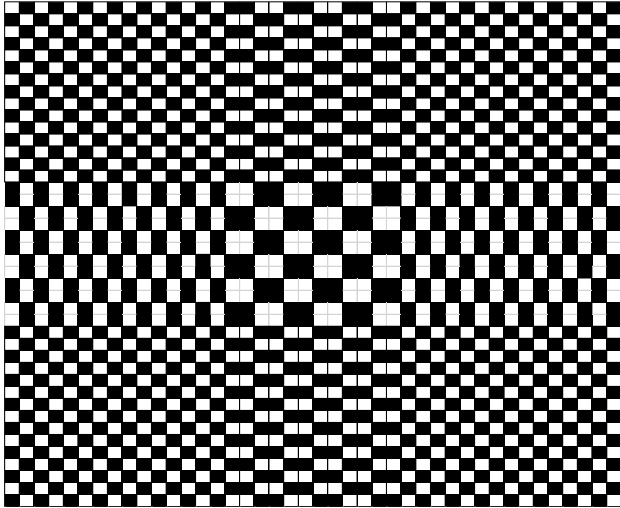


FIGURE 1

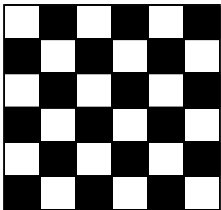


FIGURE 2

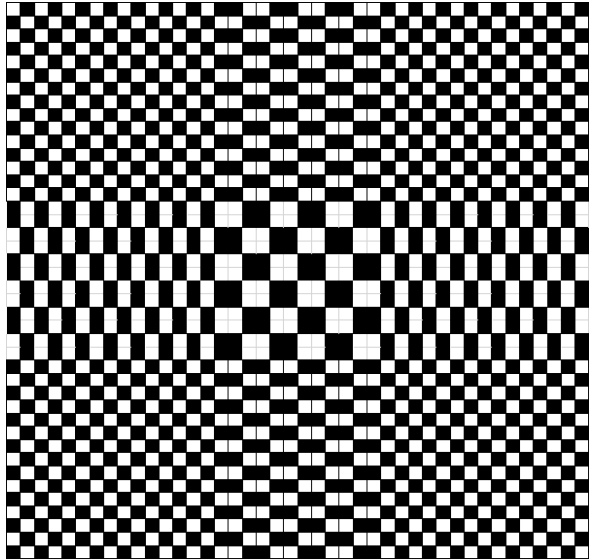


FIGURE 3

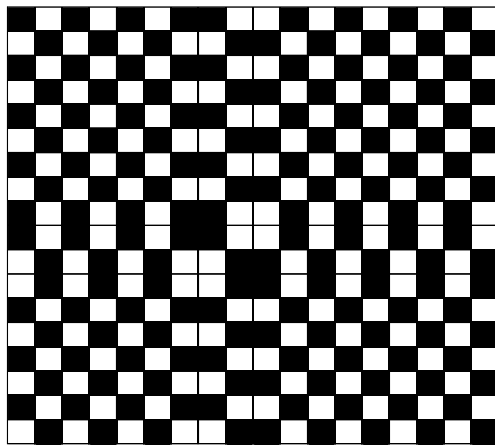


FIGURE 4(A)

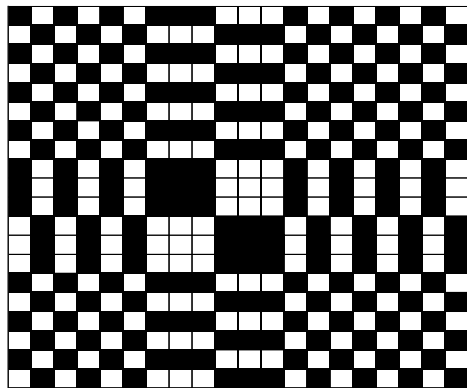


FIGURE 4(B)

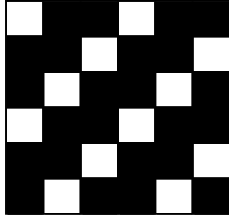


FIGURE 5

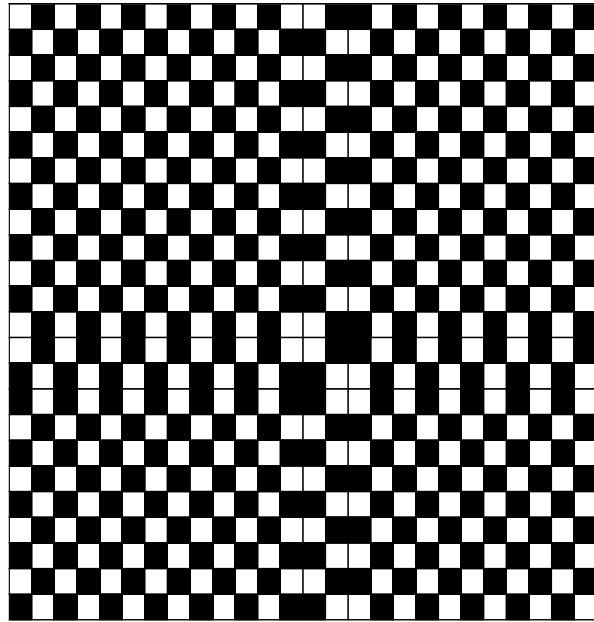


FIGURE 6(A)

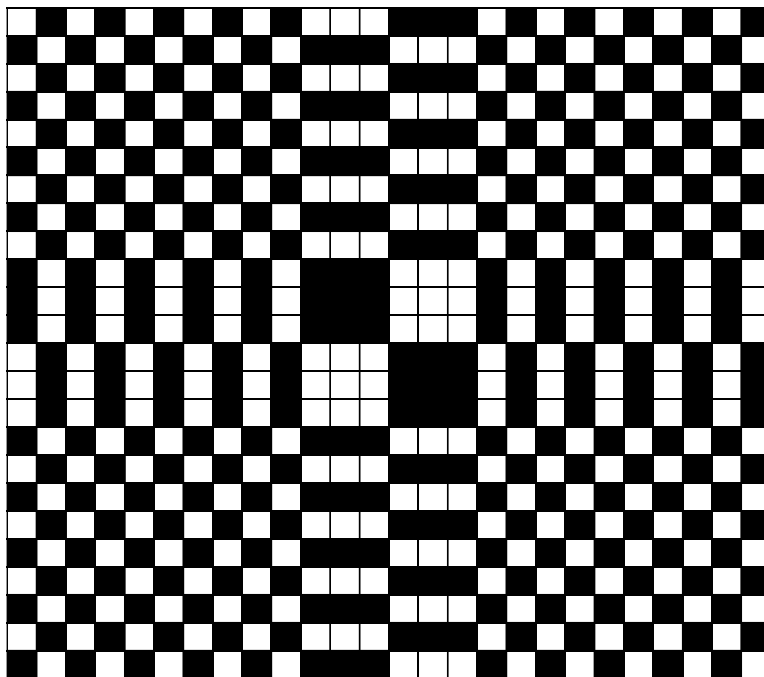
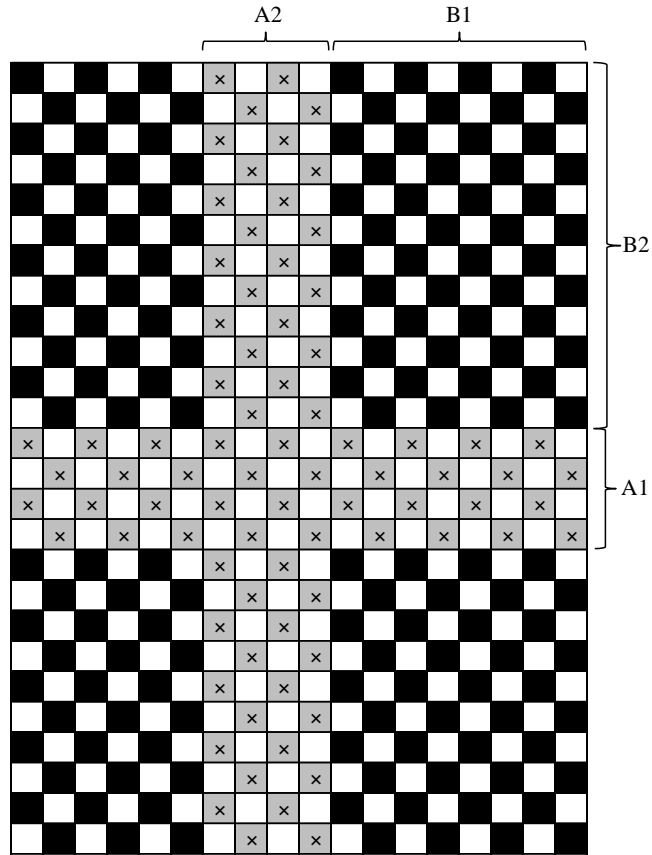


FIGURE 6(B)



A₁, A₂ – Ends and picks of course yarn of 17 Tex
 B₁, B₂ – Ends and picks of fine yarn of 5 Tex

FIGURE 7

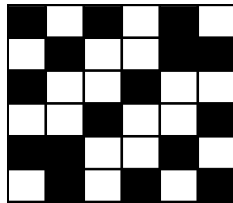


FIGURE 8

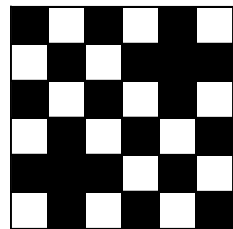


FIGURE 9

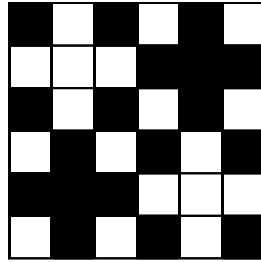


FIGURE 10

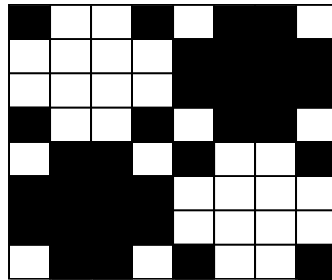


FIGURE 11

3.3 Finish

The fabric shall be given a preliminary scour, sufficient to remove sizing and other adhering material at a temperature which will not result in permanent setting of the fabric. The fabric shall then be heat-set under appropriate conditions of temperature and time followed by dyeing, as and when required, to the agreed shade with acid or disperse or pre-metallised dyes. The sequence of processes is at the manufacturers' discretion and shall be so accomplished as to achieve the specified properties. The fabric shall not be bleached.

3.4 The selvages should be straight, even and well-made and should have the same tension as the remainder of the fabric. The use of shuttle or shuttle less loom is acceptable. The acceptable fabric width shall be inclusive of the selvages produced on shuttle loom but exclusive of fringed ends produced on shuttle less looms. The fabric should be free from manufacturing and finishing defects. The finished fabric shall be thoroughly clean and shall not have any objectionable odour.

3.5 The fabric may be calendared at the discretion of the manufacturer provided the finished fabric complies with the requirements laid down in **4.1** to **4.7**.

3.6 The finished fabric shall contain silicone polymer finish so applied that it is evenly and uniformly distributed throughout the fabric. The amount of silicone polymer applied shall be from 0.3 percent to 0.5 percent based on the dry mass of the fabric. The fabric after padding with silicone emulsion shall be dried and cured to obtain proper silicone polymer finish. The manufacturer shall submit a certificate for each roll indicating that the required quantity of silicone polymer finish has been applied.

3.7 The residual size, finishing, or other non-fibrous material shall not exceed 2 percent of the dry mass of the fabric when evaluated by a method as agreed to between the buyer and the seller.

3.8 The fabric shall be delivered within one year of its date of manufacture.

4 REQUIREMENTS

4.1 The nylon fabric shall comply with the physical requirements as specified in Table 1.

4.2 Air Porosity

The air porosity as determined using Air Permeability of the fabric shall comply as specified in Table 1.

4.2.1 The air porosity of the fabric shall be determined by the method prescribed in Annex B.

4.3 Permanence of Finish

The permanence of finish of the fabric shall be such that when the fabric is subjected to the test specified in Annex C, the conditions stipulated in **4.3.1** to **4.3.3** are fulfilled.

4.3.1 The mean of the air porosity values determined after testing shall be within 15% of the mean of the readings determined before testing.

4.3.2 The fabric thickness after testing shall not exceed the specified thickness as per Table 1 for all fabrics.

4.3.3 The fabric shrinkage measured after testing shall not be more than 3% for all fabrics, either in the warp or in the weft direction.

4.4 Melting Point

The melting point of nylon yarn used in the manufacture of the fabric shall not be less than 244 °C.

4.4.1 The melting point of the nylon yarn shall be determined according to Annex C of IS 1843.

4.5 pH Value

The pH value of the finished fabric shall not be less than 5.5 nor more than 8.5.

4.5.1 The pH value of the finished fabric shall be determined by the method prescribed in IS 1390.

4.6 Colour Fastness

The dyed fabric shall be fast to light and water. The minimum colour fastness rating of change in colour of the fabric to artificial light and to washing Test 1 shall be 5 or better when tested by the

method given in IS/ISO 105-B01 or IS/ISO 105-B02 and 4 or better when tested by the method given in IS/ISO 105-C10 [Test Number A (1)].

4.7 Sealed Sample

If, in order to illustrate or specify the unmeasurable characteristics like general appearance, feel, etc, of the fabric, sample has been agreed upon and sealed, the supply shall be in conformity with the sample in such respects.

4.7.1 The custody of the sealed sample shall be a matter of prior agreement between the buyer and the seller.

Table 1 Particulars of Nylon Fabrics for Parachutes Canopy

[Clause 4.1, 4.2, 4.3.2 and 9.1 (a)]

Variety No.	Nominal Linear Density of yarn, Tex × Ply (Tolerance – 5 % to + 10%)		Ends/dm, Min	Picks/dm, Min	Mass	Thickness, Max (see Note 1)	Breaking Load per 5 cm, both ways, Min	Elongation at break, both ways, Min	Tearing Strength, both ways, Min	Air Permeability at 10” Water Head Pressure
	Warp	Weft								
	(1)	(2)	(3)	(4)	(7)	(8)	(9)	(11)	(12)	(13)
					g/m ²	mm	kgf	percentage%	kgf	cm ³ /cm ² /s
1	3.3×1	3.3×1	430	430	32 ± 10%	0.07	38	20	3.00	430-510
2	3.3×1	3.3×1	430	430	32 ± 10%	0.07	38	20	1.70	488-671
3	3.3×1	3.3×1	480	480	35 ± 10%	0.07	38	20	2.30	60-183
4	3.3×1	3.3×1	490	490	37 ± 10%	0.08	38	20	2.30	320-450
5	5.0×1	5.0×1	440	440	48 ± 5%	0.10	60	20	2.30	397-579
6	3.3×1	3.3×1	640	640	52 ± 5%	0.10	45	20	2.24	0-122
7	17×1 & 5.0×1	17×1 & 5.0×1	228 of 5.0×1 & 76 of 17×1	228 of 5.0×1 & 76 of 17×1	52 ± 5%	0.16	50	20		600-780
8	5.0×1	5.0×1	480	480	54 ± 5%	0.25	71	20	2.3	397-579
9	11.1×1	11.1×1	270	270	75 ± 5%	0.16	82	20		360-480
10	11.1×1	11.1×1	300	300	82 ± 5%	0.30	92	20	2.3	360-480
11	16.7×1	16.7×1	260	260	90 ± 5%	0.17	130	20		152-274
12	16.7×1	16.7×1	280	280	105 ± 5%	0.27	125	20		367-487
13	16.7×1	16.7×1	290	290	109 ± 5%	0.20	120	20		153-213
14	15.6×1	15.6×1	300	300	110 ± 5%		109	20		472-595
15	23.3×1	23.3×1	230	230	120 ± 5%	0.50	163	20	10	480-630
Method of Test, Ref to			IS 1963		IS 1964	IS 7702	IS 1969 (Part 1)		Annex D	Annex B

NOTE 1 — The thickness of the fabric shall be determined at a pressure of 210 g/cm².

5 PACKAGING

5.1 The nylon fabric shall be packed in continuous length on cardboard rolls which have been previously covered by a layer of kraft paper (*see* IS 1397).

6 MARKING

6.1 Each roll of nylon fabric shall be marked on both ends with the following information:

- a) Name of the material;
- b) Manufacturers' name, initials or trade-mark;
- c) Identification No. of the fabric;
- d) Width and length of the fabric;
- e) Date, month and year of manufacture;
- f) Mean air porosity; and
- g) Colour fastness ratings in the case of dyed fabric.

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 there under, and the products may be marked with the Standard Mark.

7 PACKING

7.1 The rolls shall be wrapped with polyethylene film (*see* IS 2508). A suitable number of such rolls shall be arranged in bundles and secured by 3-ply jute twine or cotton twine to form a pack. A suitable number of such packs shall then be wrapped with kraft paper and placed in wooden packing case, which is previously lined with one layer of waterproof packing paper. The gross mass of the case shall not exceed 40 kg. The empty spaces, if any, in the case shall be stuffed with cushioning material to avoid damage to the contents in transit. The case shall be nailed taking care to see that the rolls do not pierce the fabric inside the case.

8 SAMPLING

The samples shall be drawn lot-wise for carrying out tests specified in this standard. Unless otherwise specified, the lot shall be as defined under respective sampling plans as detailed in **8.1** to **8.3**.

8.1 Sampling Plan 'A' for Air Porosity

8.1.1 Lot

The total length of the nylon fabric manufactured from the same type of yarn and of same weave and finish delivered to a buyer against one despatch note shall constitute a lot.

8.1.2 Each roll of the lot shall be tested for air porosity (non-destructive) at intervals of 5 m.

7.2 Sampling Plan ‘B’

8.2.1 Lot

All the rolls of nylon fabric manufactured from same type of yarn and of same weave and finish delivered to a buyer against one despatch note shall constitute a lot.

8.2.2 One sample of one metre in length and of full width shall be drawn from each roll for carrying out the following tests:

- a) Mass;
- b) Thickness;
- c) Breaking load;
- d) Elongation at break;
- e) Tearing strength; and
- f) Yarns per decimetre.

8.3 Sampling Plan ‘C’

8.3.1 Lot

The quantity of nylon fabric manufactured from the same type of yarn and of same weave and finish delivered to a buyer against one despatch note shall constitute a lot.

8.3.2 One sample of two metres in length and of full width shall be selected from each lot for carrying out the following tests:

- a) Permanence of finish;
- b) pH value of aqueous extract;
- c) Colour fastness to light and washing;
- e) Weave;
- f) Melting point of yarn;
- g) Tenacity of yarn; and
- h) Turns per metre.

9 VISUAL INSPECTION AND CRITERIA FOR CONFORMITY

9.1 Each lot as defined in **8.3.1** shall be visually examined for the following:

- a) Width — The width of the roll of fabric shall not be less than the value as given in Table 1. The rolls having less width shall be segregated and rejected.

b) Total Length of Each Roll — The lot shall be unacceptable if the total of the actual length of the rolls examined is less than the total of the length marked on the rolls.

c) Each roll shall be examined for the markings as detailed in **6.1**, on both ends.

d) Freedom from Defects — Each roll shall be visually examined for the defects as specified in Annex E. No roll shall contain more than 7 major defects/100 m. For this purpose, all the rolls shall be visually examined metre by metre and the defects classified in accordance with Annex E. The unit of the product for examination shall be one linear metre. For each unit of product, the defects shall be counted as follows:

e) Each major defect shall be flagged by a red string sewn in the selvedge. Three minor defects occurring per linear metre shall be flagged by a red string sewn in the selvedge. 50 cm allowance shall be made for each major defect flagged except for continuous defect which shall be given a one metre allowance for each metre in which defect occurs.

f) Unless otherwise specified the fabric shall be in continuous lengths of not less than 80 m without joints. Shorter cuts are

- (i) One major defect and one minor defect shall be counted as one major defect.
- (ii) Three or more minor defects shall be counted as one major defect.
- (iii) One or more major defects shall be counted as one major defect.
- (iv) A continuous major defect shall be counted as one major defect for each unit of product or fraction thereof in which it occurs.

e) Each major defect shall be flagged by a red string sewn in the selvedge. Three minor defects occurring per linear metre shall be flagged by a red string sewn in the selvedge. 50 cm allowance shall be made for each major defect flagged except for continuous defect which shall be given a one metre allowance for each metre in which defect occurs.

f) Unless otherwise specified the fabric shall be in continuous lengths of not less than 80 m without joints. Shorter cuts are allowed in accordance with the following:

Minimum Length of Cuts	Permissible Short Cuts in Total Supply
<u>m</u>	<u>percent</u>
80	75
40	15
10	10

g) Overall Examination — Each roll shall be visually examined for overall defects as follows:

- (i) Spottiness, poor penetration of dye or off shade;
- (ii) Uneven weaving throughout; and
- (iii) Unevenness and streakiness of dyeing in excess of that shown by sealed sample (*see 4.8*) for appearance.

h) From the observed values for breaking load and tearing strength, the average X shall be within the limit specified. No individual reading shall be less than 95 percent of the minimum value specified.

j) All the test specimens tested for the remaining characteristics shall also satisfy the relevant requirements.

ANNEX A
(Clause 2)

LIST OF REFERRED STANDARDS

<i>IS No.</i>	<i>Title</i>
IS 1390 : 2022	Textiles — Determination of <i>pH</i> of aqueous extract (<i>third revision</i>)
IS 1397 : 2020	Kraft Paper for Packing and Wrapping — Specification (<i>third revision</i>)
IS 1843 : 2023	Nylon monofilaments — Specification (<i>first revision</i>)
IS 1963 : 1981	Methods for Determination of Threads Per Unit Length in Woven Fabrics (<i>second revision</i>)
IS 1964 : 2001	Textiles — Methods for Determination of Mass Per Unit Length and Mass Per Unit Area of Fabrics (<i>second revision</i>)
IS 1969 (Part 1) : 2018	Textiles — Tensile Properties of Fabrics Part 1 Determination of Maximum force and Elongation at Maximum Force Using the Strip Method (<i>fourth revision</i>)
IS 2508 : 2016	Polyethylene films and sheets — Specification (<i>third revision</i>)
IS 6359 : 2023	Method for conditioning of textiles (<i>first revision</i>)
IS 7702 : 2012	Textiles — Determination of thickness of textiles and textile products (<i>first revision</i>)
IS/ISO 105-B01 : 2014	Textiles — Tests for colour fastness — Part B01 Colour fastness to light: Daylight
IS/ISO 105-B02 : 2014	Textiles — Tests for colour fastness — Part B02 Colour fastness to artificial light: Xenon arc fading lamp test
IS/ISO 105-C10 : 2006	Textiles — Tests for colour fastness Part C10 Colour fastness to washing with soap or soap and soda

ANNEX B
(Clause 4.2.1 and Table 1)

METHOD FOR DETERMINATION OF AIR POROSITY

B-1 TEST SPECIMENS

B-1.1 For the purpose of this test, all the pieces of nylon fabric selected as in **8.1.2** constitute the test specimens.

B-2 CONDITIONING OF TEST SPECIMENS

B-2.1 Prior to test, the test specimens shall be conditioned in a standard atmosphere at 65 percent \pm 2 percent relative humidity and $27\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ temperature for 24 hours (*see also* IS 6359).

B-3 PRINCIPLE

B-3.1 The method is based on the measurement of the rate of flow of air through a given area of the fabric by a given pressure drop across the fabric.

B-4 APPARATUS

B-4.1 The apparatus shall consist of:

- a) a suction or a blower fan for drawing air through a known area of fabric;
- b) circular orifice;
- c) clamp to hold the test specimen (*see* Note);
- d) means for adjusting the pressure drop across the fabric to a known amount; and
- e) means for measuring the velocity of air flowing through the fabric.

NOTE — The clamp should be such as to effectively eliminate peripheral leakage of air.

B-4.2 The apparatus shall be capable of testing large pieces without cutting.

B-5 PROCEDURE

B-5.1 Take one of the test specimens conditioned as in **B-2** above. Mount a portion of the test specimen between the clamp and the circular orifice with sufficient tension to eliminate wrinkles, if any, taking care to see that the fabric is not distorted in its own plane.

B-5.2 Start the suction or the blower fan and adjust the rate of flow of air till a pressure drop of 25 cm water head across the fabric is indicated.

B-5.3 Note the rate of flow of air in cubic centimeter per second.

B-5.4 Repeat the test at intervals of 5 meters over the entire length of the piece.

B-5.5 Calculate the mean of all the test values.

B-5.6 Calculate the rate of flow of air per square centimeter of fabric per second by the following formula:

$$F = \frac{f}{A}$$

Where,

F = rate of flow of air per square centimeter of fabric in cubic centimeter per second;

f = mean rate of flow of air in cubic centimeter per second through the fabric as obtained in **B-5.5**; and

A = area of the fabric under test in square centimeters.

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

ANNEX C
(Clause 4.3 and 4.4.1)

METHOD FOR DETERMINATION OF PERMANANCE OF FINISH

C-1 TEST SPECIMENS

C-1.1 Cut out two test specimens measuring approximately 50 cm × 50 cm from each piece of nylon fabric.

C-2 PROCEDURE

C-2.1 Determine the air porosity and thickness of the two test specimens taken from the same piece in accordance with the method prescribed in Annex B and Table 1.

C-2.2 Using a template and indelible ink, mark out a square measuring 45 cm × 45 cm on each test specimen. Make the test specimen in the form of loops by stapling the two opposite sides in such a way that one of the test specimens has the warp yarns and the other has the weft yarn in the vertical direction in the loop. Place both the test specimens in the loop form in a container of adequate capacity filled with boiling water to within 7.5 cm of the top. Insert a glass rod of 6.5 mm diameter and 55 cm long on the top of the loop of each test specimen. Place a glass tube or rod of similar dimensions as the glass rod and weighing approximately 45 g at the bottom of the loop of each test specimen. Suspend both the loops in such a way (by binding each glass rod with twine or wire to another glass rod of similar dimensions to rest on the top of the container) that they are completely immersed in the boiling water.

C-2.3 Subject the specimens to the action of boiling water for a period of 15 minutes. Remove the test specimens from the bath and allow the water to drain off for a few minutes. Remove the staples from the test specimens and place them flat on a horizontal screen and dry them in air.

C-2.4 When the test specimens are thoroughly dried, condition the test specimens in a standard atmosphere of 65 percent ± 2 percent RH and 27 °C ± 2 °C for at least 4 hours.

C-2.5 Measure the 45 cm square marked on the specimens to the nearest millimetre at 6 different places, 3 in the warp direction and 3 in the weft direction and compute the mean of each.

C-2.6 Measure the air porosity of the test specimens by the method given in Annex B and compute the mean air porosity.

C-2.7 Measure the thickness of the specimens in accordance with the method prescribed in Table 1 and compute the mean thickness.

C-2.8 Calculate the percentage shrinkage in the warp and the weft direction of the test specimens by the following formula:

$$S = \frac{45 - d}{45} \times 100$$

Where,

S = percentage shrinkage in the warp or the weft direction, and

d = mean distance between the marks in cm after boiling (*see* C-2.5).

C-2.9 Repeat the test with the remaining test specimens.

ANNEX D

(Table 1)

METHOD FOR DETERMINATION OF TEARING STRENGTH OF WOVEN FABRICS

D-1 TEST SPECIMEN

D-1.1 Prepare ten rectangular test specimens of size 75 mm × 200 mm, five from each warp and weft direction. Cut the specimens to be used for the measurement of the tearing strength of warp yarns with the longer dimensions parallel to the weft yarns and the specimens to be used to measure the tearing strength of weft yarns with the longer dimensions parallel to the warp yarns. Cut a 75 mm slit lengthwise in each specimen starting in the centre of one of the short edges. Test the specimens in each warp and weft direction.

D-2 CONDITIONING OF THE TEST SPECIMENS

D-2.1 Prior to test, the test specimen shall be conditioned in a standard atmosphere at 65 percent ± 2 percent RH and 27 °C ± 2 °C temperature (*see* IS 6359) for at least 24 hours.

D-3 APPARATUS

D-3.1 Tensile Testing Machine of Constant Rate of Traverse

Type — The maximum load required to tear the specimens shall be within the rated operating capacity of the tester which may be considered as the range of 15 to 85 percent of the rated capacity.

D-3.2 Clamps, having gripping surfaces parallel, flat and capable of preventing slipping of the specimen during a test, and measuring at least 25 mm × 75 mm, with the longer dimensions perpendicular to the direction of application of the load.

D-4 PROCEDURE

D-4.1 Test the conditioned specimens in the standard atmosphere of 65 percent ± 2 percent relative humidity and 27 °C ± 2 °C temperature.

D-4.2 Set the nominal gauge length at 75 mm and select the capacity of the tester suitable for the specimen to be tested. Operate the pulling jaw at 300 mm/min ± 10 mm/min.

D-4.3 Disengage the pawls on the pendulum from the ratchet so that they become inoperative.

D-4.4 Place the specimen in the clamps so that the slit is centered in the jaws and one of the tongues is held in each clamp in such a manner that originally adjacent cut edges of the tongues form a straight line joining the centres of the clamps and the two tongues present opposite faces of the fabric to the operator.

D-4.5 If the force to tear a single specimen is less than the minimum working range of the tester at the time of use, superimpose the minimum number of specimens required to bring the tearing force within working range of the tester to form a multiply specimen and in that case appropriate number of test specimens are to be prepared according to **D-1.1**. If a multiply specimen is required, grip the plies together in the machine and tear them simultaneously.

D-4.6 Start the testing machine and the autographic recorder. Continue the tear until the moving jaw has travelled for a minimum of 75 mm after the tear was initiated as registered on the chart (approximately 38 mm length of tear).

D-5 CALCULATION

D-5.1 Calculate the tearing strength of each specimen by averaging the five highest peak load registered during 75 mm of travel of the moving clamp ignoring the initial peak load (*see Note*) and dividing by the number of plies if more than single (*see D-4.5*).

NOTE — Frequently the initial peak force required to continue the tear is substantially greater than subsequent peak and should be ignored in the calculation.

D-5.2 Calculate the tearing strength of the sample as the average of the tearing strength obtained for the tested specimens (*see D-5.1*) to the nearest 50 g in both warp and weft direction. Divide the average obtained by the number of plies in the specimen.

D-6 REPORT

D-6.1 Report the lot to be in conformity with the requirements of **3.3**, if the average tearing strength of the test specimens in both warp and weft directions as calculated above are not less than the minimum specified in Table 1, col 2.

ANNEX E
[Clauses 9.1(d)]

CLASSIFICATION OF DEFECTS

<i>Sl No.</i>	<i>Defect</i>	<i>Description</i>	<i>Major</i>	<i>Minor</i>
(1)	(2)	(3)	(4)	(5)
i)	Abrasion	Any abrasion mark showing fuzziness	×	—
ii)	Biased filling	Biased filling more than 5 cm from horizontal at greatest point of bias	×	—
iii)	Bowed filling	Filling bow more than 5 cm in height (as measured from a straight line cord to the highest point of arc)	×	—
iv)	Broken or missing end	Two or more contiguous, regardless of length	×	—
v)		Single, more than 90 cm long	×	—
		Single 90 cm long or less	—	×
vi)	Broken or missing pick	Two or more contiguous, regardless of length	×	—
		One pick, full width	—	×
vii)	Cut, hole, or tear (other than pin holes, etc)	Three or more warp or filling threads ruptured at adjoining points	×	—
viii)	Floats or skips	Any multiple float 5 mm or more	×	—
		Single floats of 1 cm or more in length	×	—
		Contiguous float or pin floats*, the sequence of which measures 2 cm or more in length	×	—
		Any multiple float up to 5 mm square	—	×
		Single float up to 1 cm in length	—	×
		Contiguous float or pin floats ¹⁾ , the sequence of which measures less than 2 cm in length	×	—
ix)	Heavy filling bar or heavy place	Over 0.5 cm in width and varying 10 percent or more from normal pick count	×	—
		Over 1 cm in width and varying less than 10 percent from normal pick count	×	—

		0.5 cm or less in width and varying 10 percent or more from normal pick count	—	×
		1 cm or less in width and varying less than 10 percent from normal pick count	—	×
x)	Jerked-in filling	Any jerked-in filling occurring more than 4 times within 25 cm	×	—
		Any jerked-in filling occurring 4 times or less within 25 cm	—	×
xi)	Loops, kinks or snarls (except selvage)	All over 3 mm in length	×	—
		Three or more (in any linear meter) up to 3 mm in length	×	—
		Up to two (in any linear meter) up to 3 mm in length	—	×
xii)	Mis pick or double pick	Three or more additional picks in the shed	×	—
		Two picks	—	×
xiii)	Pin holes or yarn deformations	Over 6 pinholes or yarn deformations occurring within an area equal to a 15 cm diameter circle	×	—
		Three to six pin holes or yarn deformations occurring within an area equal to a 15 cm diameter circle	—	×
xiv)	Selvage cut, broken, torn or scalloped	Any cut, broken, torn, or scalloped selvage	×	—
xv)	Selvage slack or wavy	Clearly noticeable waviness along selvage edge when no tension is on selvage	×	—
xvi)	Selvage stringy or loopy 1.5 mm (1/16 in) loops shall be acceptable	More than 8 cm of continuous stringy or loopy selvage projecting 3 mm or more	×	—
xvii)		Continuous stringy or loopy selvage projecting up to 3 mm	—	×
xviii)	Selvage tight	Any clearly noticeable roll of edge or edges when tension is released	×	—
xix)	Reinforced selvage fraying	Design proper weave eliminate warp fraying	—	×
xx)	Smash	Any smash	×	—
xxi)	Spot, stain or streak (not	Single ends or picks 40 cm or more in length	×	—

	applicable to dye streaks)	Double ends or picks 20 cm or more in length	×	—
		Over 2 ends or picks 12 cm or more in length or a clearly noticeable area more than 6 mm ² in area whichever is greater	×	—
		Single ends or picks 6 cm up to 40 cm in length	—	×
		Over two ends or picks less than 12 cm in length or a clearly noticeable area 6 mm ² or less in area, whichever is greater.	—	×
xxii)	Slubs or strip back ²⁾	More than 5 over 1 cm in length	×	—
		Two up to and including 5 over 2 cm in length	×	—
		One over 2 cm in length	×	—
		Five or less over 1 cm but not exceeding 1 cm in length	—	×
		One over 1 cm but not exceeding 2 cm in length	—	×
xxiii)	Weak place	Any weak place	×	—
xxiv)	Weave	Pattern not conforming to weave diagram specified	×	—
xxv)	Width	Less than specified	×	—
xxvi)	Wrong draw	Resulting in clearly noticeable warp wise streak more than 45 cm in length	×	—
xxvii)	Manufacturer's Missing (weavers) Identification Yarn			
<p>* A pin float is defined as a float measuring 3 mm or less. Single pin float shall not be considered as defect.</p> <p>* A strip back is defined as a broken filament(s) wrapped around the remaining yarn forming an enlarged area resembling a slub.</p>				