

भारतीय मानक  
Indian Standard

IS 6349 : 2024

वस्त्रादि — वायु आकाशीय प्रयोजनों के  
लिए ट्यूबलर नायलॉन टेप — विशिष्टि  
नल्लोकार (दूसरा पुनरीक्षण)

Textiles — Tubular Nylon Tapes for  
Aerospace Applications —  
Specification

(Second Revision)

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## Indian Standard

TEXTILES — TUBULAR NYLON TAPES FOR AEROSPACE  
APPLICATIONS — SPECIFICATION

(Second Revision)

## 1 SCOPE

This standard covers requirements for two types of tubular nylon tapes used in the aerial delivery equipment including personnel parachutes.

## 2 REFERENCES

The standards listed in Annex A contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions, indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of these standards.

## 3 TYPES

Based on the thickness and GSM tubular nylon tapes are classified as follows:

- a) Type I — having Max 39 GSM and 2.3 mm thickness under a pressure of 200 g/cm<sup>2</sup>; and
- b) Type II — having Max 12 GSM and 2.3 mm thickness under a pressure of 200 g/cm<sup>2</sup>.

## 4 MATERIALS

4.1 The following high tenacity nylon yarns made out of nylon-66 or nylon-6 may be used in the manufacture of nylon tubular tape and number of plies in the yarn shall be as follows:

Sl No.	Type	Denier × Ply of Warp Yarn	Denier × Ply of Weft Yarn	Tenacity, g/Denier (gpd), Min
(1)	(2)	(3)	(4)	(5)
i)	Type I	840 × 2 or 1680 × 1	840 × 1	8.5
ii)	Type II	210 × 1	210 × 5 or 1 050 × 1	6.5
	Tolerance, percent	± 10		
	Method of test, Ref to	IS 4910 (Part 2)		IS 1670

4.2 The nylon yarn shall be bright, light and heat resistant and have melting point not less than 247 °C for nylon 66 and not less than 215 °C for nylon-6.

NOTE — In order to ascertain whether nylon-66 or nylon-6 is used the method of test for the determination of melting point as per IS 5762 may be followed.

4.3 The twist in the final ply shall not be less than 100 tpm when tested as given in IS 832 (Part 1).

4.4 The nylon yarn shall be free from stains, finishing and dressing materials.

## 5 REQUIREMENTS

5.1 The finished nylon tape shall meet the requirements given in Table 1.

## 5.2 Residual Shrinkage

The residual shrinkage of the nylon tubular tape shall not exceed 2.0 percent when tested in accordance with IS 2977.

## 5.3 Resistance to Accelerated Ageing

The tubular nylon tape shall not lose more than 25 percent of its original breaking strength when subjected to treatment for accelerated ageing given in Annex E of IS 4727.

5.4 The tubular nylon tape shall not lose more than 25 percent of its original breaking strength after being kept in an oven for one hour at 180 °C ± 3 °C and subsequently conditioned as given in IS 6359.

## 5.5 Sealed Sample

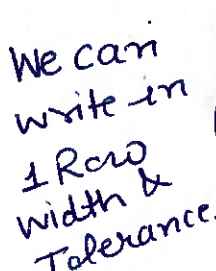
If in order to illustrate or specify the characteristics like general appearance, colour, feel, etc, of the tubular nylon tape, a sample has been agreed upon and sealed, the supply shall be in conformity with the sample in such respects.



→ No need to mention here.

Table 1 Requirements for Tubular Nylon Tape for Aerospace Applications

(Clause 5.1)

SI No.	Characteristic	Requirement for		Method of Test, Ref To
		Type I	Type II	
(1)	(2)	(3)	(4)	(5)
i)	Length of roll	100 m, or as required by the buyer. 10 percent of the supplies may be made in short length pieces subject to the condition that short length pieces are 20 metre or its multiples.		IS 1954
ii)	<del>Width, in mm</del> <b>Width, mm, Tolerance, mm</b> 	← 25 (+ 2, - 0) →		
iii)	Thickness, mm, <i>Max</i> under a pressure of 200 g/cm <sup>2</sup>	2.3	1.5	IS 7702
iv)	Ends in full width, <i>Min</i>	140	206	IS 1963
v)	Picks/dm, <i>Min</i>	200	170	
vi)	Mass, g/m <sup>2</sup> , <i>Max</i> (see Note 1)	39	12	IS 1964
vii)	Breaking load in full width × 20 cm between grips, N, <i>Min</i> (see Note 2)	13 377	2 352	IS 1969 (Part 1)
viii)	Elongation at break, <i>Min</i> , percent (see Note 2)		18	
ix)	Weave	Tubular, plain 1/1		—
x)	Colour fastness to light	5 or better		IS/ISO 105-B01 or IS/ISO 105-B02
xi)	Colour fastness to washing	4 or better		IS/ISO 105-C10 [Test Number A (1)]
xii)	pH	5.5 to 8.5		IS 1390

## NOTES

1 Prior to cutting test specimens for mass (g/m<sup>2</sup>) test, the nylon tubular tape shall be subjected to a tension equal to its one percent specified minimum breaking load for 60 s ± 5 s on a breaking load testing machine.

2 In case of dyed webbing, + 5 percent relaxation shall be allowed in mass and extension at break.

## 6 PACKING

6.1 Unless otherwise agreed to between the buyer and the seller, the tubular nylon tapes shall be packed as given in 6.2.

6.2 An appropriate number of rolls shall be arranged in a cylindrical bundle and secured by 3 ply jute twine (see IS 1912) to form a pack. A suitable number of such packs shall be arranged and wrapped with polyethylene film of at least 100 microns thickness (see IS 2508) and placed in a wooden packing case of adequate strength, previously lined with one layer of waterproof packing paper

conforming to Type 2 of IS 1398. The empty spaces, if any, in the packing case shall be stuffed with cushioning materials to avoid damage in transit. The case shall be bound by iron hoops or wires. The gross mass of the case shall not exceed 40 kg.

## 7 MARKING

7.1 Each roll shall provide the following information on a label attached to it:

- Length (m), width (mm) and thickness (mm);
- Date of manufacture in a suitable code;

- c) Manufacturer's name/trade-mark;
- d) Colour and finish, if not grey; and
- e) Any other information desired by the purchaser.

## 7.2 BIS Certification Marking

The tubular nylon tape rolls 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 nylon tape rolls may be marked with the Standard Mark.

## 8 SAMPLING

### 8.1 Lot

The quantity of tubular nylon tape of the same type and width in a consignment shall constitute a lot.

8.2 Unless otherwise specified in the contract or order, the sampling plan given in Table 2 shall be followed.

8.2.1 Rolls shall be selected at random (*see* IS 4905).

8.2.2 Sub-sample rolls specified in col (5) of Table 2 shall be drawn from the sample rolls selected according to col (3) of the Table 2.

## 9 NUMBER OF TEST SPECIMENS AND CRITERIA FOR CONFORMITY

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

9.2 For breaking load and elongation test, an additional 2 m test sample from each of the sample rolls remaining after drawing the subsample (*see* 8.2.2) shall be taken if so, specified in the contract.

Table 2 Scale of Sampling  
(Clauses ~~8.1~~, 8.2 and Table 3)

[delete 8.1]

SI No.	No. of Rolls in the Lot	Sample Size	Permissible No. of Defective Rolls in Respect of Tests on Sample Rolls	Sub-sample Size	Permissible No. of Defective Rolls in Respect of Tests on Sub-sample Rolls
(1)	(2)	(3)	(4)	(5)	(6)
i)	Up to 25	3	0	3	None
ii)	26 to 100	5	0	4	
iii)	101 to 150	8	0	5	
iv)	151 to 300	13	0	7	
v)	301 to 500	20	1	8	
vi)	501 to 1 000	50	1	9	
vii)	Above 1 000	80	2	10	

Table 3 Number of Test Specimens and Criteria for Conformity

(Clause 9.1)

SI No.	Characteristic	Number of Samples	Criteria for Conformity
(1)	(2)	(3)	(4)
i)	Length, linear density, width, mass, thickness, ends, weave, picks and plies	According to col (3) of <u>Table 2</u>	Non-conforming rolls not to exceed corresponding number given in col (4) of <u>Table 2</u>
ii)	Breaking load, elongation, ageing, colour fastness, shrinkage	According to col (5) of <u>Table 2</u>	All the rolls to satisfy the relevant requirements