

null, Viewed on 29/08/2022 00:46:18, TCP/IP Address : 192.168.0.189

IS 4229 : 1992  
(Reaffirmed 2019)  
Reaffirmed : 2008  
(Reaffirmed 2013)

शुद्धमानक

तख्तमदि - वायु आकाशीय कार्यों के लिए सिलाई  
करने के नायलोन के धागे - विशिष्ट

( दूसरा पुनरीक्षण )

*Indian Standard*

TEXTILES — NYLON SEWING THREADS FOR  
AEROSPACE PURPOSES — SPECIFICATION

*(Second Revision)*

UDC 677.494.675.072.6 : 687.023 : 629 73

© BIS 1992

BUREAU OF INDIAN STANDARDS  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI 110002

October 1992

Price Group 3

null, Viewed on 29/08/2022 00:46:18, TCP/IP Address : 192.168.0.189

Textile Materials for Aerospace Purposes Sectional Committee, TX 13

## FOREWORD

This Indian Standard ( Second Revision ) was adopted by the Bureau of Indian Standards, after the draft finalized by the Textile Materials for Aerospace Purposes Sectional Committee had been approved by the Textile Division Council.

This Indian Standard, first published in 1967 and subsequently revised in 1978, was based on IND/ADE/0063 'Thread, sewing, nylon, undyed/dyed' issued by the Ministry of Defence, Government of India. It has been revised again on the basis of experience gained during its use. The major changes carried out in this revision are as follows:

- a) The requirement for minimum length of sewing thread per unit mass has been included.
- b) The tolerances on twist levels have been specified.
- c) The values of breaking strength and extension at break have been amended in the light of experience gained in the past.
- d) Nominal count of yarn used in the sewing threads have been specified as commonly used in industry.
- e) The condition of material, in which thread shall be supplied, has been specified.
- f) The relaxation with respect to breaking strength, extension at break and length per unit mass for the dyed threads has been included.

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 : 1960 'Rules for rounding off numerical values (revised)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

null, Viewed on 29/08/2022 00:46:18, TCP/IP Address : 192.168.0.189

**AMENDMENT NO. 1 APRIL 1998  
TO  
IS 4229 : 1992 TEXTILES — NYLON SEWING  
THREADS FOR AEROSPACE PURPOSES —  
SPECIFICATION**

(Second Revision)

(Page 1, clause 3, first sentence) — Substitute the following for the existing matter.

'Bright, high tenacity, continuous multifilament yarn of nylon 6 or nylon 6.6 shall be used in the manufacture of sewing thread.'

(Page 2, Table 1) — Substitute the following table for the existing:

**Table 1 Physical Requirements**  
(Clauses 5.1 and 5.2)

Variety No.	Structure of Sewing Thread		Length per Unit Mass, <i>Min.</i> m/kg (see Note 1)	Average Breaking Strength <i>Min.</i> , N (see Notes 1 and 2)	Average Extension at Break, <i>Max.</i> Percent (see Note 1)
	Filament Yarn Linear Density Tex	No. of Plics			
L1	23	2	18 500	23.5	28
L2	23	3	12 300	35.0	28
H1	23	6 (2×3)	6 150	71.0	28
H2	23	9 (3×3)	4 100	106.0	28
H3	23	12 (4×3)	3 075	141.0	28
H4	23	18 (6×3)	2 050	211.0	28
Method of Test	—		IS 4910 (Part 2) : 1989 IS 4910 (Part 3) : 1989		

NOTES

- 1 In case of dyed threads, 5 percent relaxation shall be allowed in length per unit mass, breaking strength and extension at break.
- 2 No individual reading of breaking strength shall be less than 95 percent of the specified value.

(TX 13)

Reprography Unit, BIS, New Delhi, India

*Indian Standard***TEXTILES — NYLON SEWING THREADS FOR  
AEROSPACE PURPOSES — SPECIFICATION***( Second Revision )***1 SCOPE**

1.1 This standard prescribes the constructional particulars and performance requirements for 6 varieties of nylon sewing threads used for stitching aerospace textile materials.

**2 REFERENCES**

2.1 The Indian Standards listed in Annex A are necessary adjuncts to this standard.

**3 YARN**

Bright continuous multifilament yarn of nylon 6 or nylon 6.6 shall be used in the manufacture of sewing thread. The yarn shall be even and uniform with suitable twist to produce a balanced thread.

**4 FINISH****4.1 General**

The threads shall be supplied heat set and in one of the following conditions according to the agreement between the buyer and the seller:

- a) Undyed,
- b) Undyed and bonded,
- c) Dyed, or
- d) Dyed and bonded.

4.2 A lubricating finish may be applied to the thread to facilitate its performance.

4.3 Finishing and bonding agents shall not contain substances known to promote microbiological growth.

**4.4 Dyeing**

If dyeing is required, the colour and depth of shade shall be as specified in contract or order. For dyeing, metallic or chrome dyes shall not be used. The dyeing should be uniform throughout and dyed threads should be free from dyeing defects.

**5 REQUIREMENTS**

5.1 The nylon sewing threads shall conform to the requirements specified in Table 1 and Table 2.

**5.2 Twist**

Threads shall be supplied with suitable twist levels as agreed to between the buyer and the seller so as to meet the requirements given in Table 1. The twist shall not vary more than  $\pm 10$  percent for any level of twist.

5.2.1 The direction of twist in single yarn and final thread shall be at the discretion of the manufacturer. However, the direction of twist starting from single yarn should be S/Z for plied and S/S/Z for cabled threads.

5.2.2 The amount of twist shall be tested in accordance with IS 832 : 1985.

**5.3 Extension Under Load**

The extension of the threads, when subjected to a load equal to 25 percent of the specified strength for  $60 \pm 5$  seconds, shall not exceed 15 percent.

**5.4 Shrinkage in Boiling Water**

The mean shrinkage of the threads in boiling water, when determined in accordance with the method prescribed in IS 4910 ( Part 5 ) : 1989, shall not exceed 2.5 percent.

**5.5 Sewing Properties**

5.5.1 Threads of minimum length per unit mass of not less than 9 000 m/kg shall be tested in accordance with Annex B. The stitching pattern shall be completed without slipped or broken stitches and the number of malformed stitches shall not exceed two.

5.5.2 Threads other than those specified in 5.5.1 shall be tested in accordance with Annex C. The stitching pattern shall be completed without slipped or broken stitches and the number of malformed stitches shall not exceed two.

**6 SEALED SAMPLE**

6.1 If, in order to specify the shade, tone, finish, and general appearance, etc, a sample has been agreed upon between the buyer and the seller and sealed, the supply shall be in conformity with the sealed sample in such respects.

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

null, Viewed on 29/08/2022 00:46:19, TCP/IP Address : 192.168.0.189

IS 4229 : 1992

**Table 1 Physical Requirements**  
( Clauses 5.1 and 5.2 )

Var No.	Structure of Sewing Thread		Length per Unit Mass <i>Min.</i> m/kg	Average Breaking Strength <i>Min.</i> N	Extension at Break, <i>Min.</i> Percent
	Filament Yarn Linear Density, tex	No. of Plies			
L1	23	2	18 500	23.5	28
L2	23	3	12 300	35.0	28
H1	23	6 (2 × 3)	6 150	71.0	28
H2	23	9 (3 × 3)	4 100	106.0	28
H3	23	12 (4 × 3)	3 075	141.0	28
H4	23	18 (6 × 3)	2 050	211.0	28
Method of Test	—		IS 4910 (Part 2) : 1989	IS 4910 ( Part 3 ) : 1989	

NOTE — In case of dyed threads, 5 percent relaxation shall be allowed in length per unit mass, breaking strength and extension at break.

**Table 2 Chemical Requirements**  
( Clause 5.1 )

Sl No.	Characteristic	Requirement	Method of Test
i)	Colour fastness to :		
	a) Light	5 or better	IS 2454 : 1985
	b) Washing, Test 2 ( Change in colour and staining of adjacent fabrics )	4 or better	IS 3361 : 1979
	c) Dry-cleaning	4 or better	IS 4802 : 1988
ii)	Conductivity of aqueous extract ( see Notes 1 and 2 ), <i>Max</i>	150 S/cm	IS 4420 : 1967
iii)	pH value of aqueous extract	6 to 8	IS 1390 : 1983 ( Cold method )
iv)	Water soluble chlorides, as NaCl, <i>Max</i>	0.1 percent	IS 4202 : 1967
v)	Water soluble sulphates, as Na <sub>2</sub> SO <sub>4</sub> , <i>Max</i>	0.25 percent	IS 4203 : 1967

#### NOTES

1 Test for pH value, water soluble chlorides and sulphates to be carried out only when the conductivity exceeds the specified value.

2 The nylon sewing thread failing in respect of conductivity shall be rejected if it fails also in respect of pH, water soluble chlorides or water soluble sulphates.

#### 7 PACKAGING

7.1 The nylon sewing threads shall be compactly wound on reels or bobbins or in any other form and supplied as detailed in the contract or order. The free end of the thread shall be securely fastened to prevent unravelling.

#### 8 MARKING

8.1 Each package shall be marked, preferably by a label, with the following information:

- Name of the material,
- Variety No. ( see Table 1 ),

c) Nominal length or mass of thread in metres in a unit package,

d) Year of manufacture, and

e) Indication of the source of manufacture.

8.1.1 Each package may also be marked with the Standard Mark.

#### 9 PACKING

9.1 Unless otherwise specified, the package containing the nylon sewing thread shall be packed in accordance with IS 1066 : 1980.

**10 SAMPLING AND CRITERIA FOR CONFORMITY****10.1 Lot**

The quantity of sewing thread of same quality and variety delivered to a buyer against one despatch note shall constitute a lot.

10.2 The conformity of the lot to the requirements of this standard shall be determined on the basis of tests carried out on the sample selected from it. Unless otherwise agreed to between the buyer and the seller, the number of packages to be selected from a lot shall be according to Table 3. To ensure randomness of selection, methods given in IS 4905 : 1968 shall be followed.

**Table 3 Sample Size and Permissible Number of Non-conforming Packages**  
(Clauses 10.2 and 10.3)

Lot Size	Sample Size	Permissible Number of Non-conforming Packages
Up to 100	5	0
101 to 300	10	0
301 to 500	15	0
501 to 1 000	20	1
1 001 and above	30	1

10.3 The sample size and criteria for conformity for various characteristics shall be as follows:

Characteristics	Samples Size	Criteria for Conformity
a) Breaking strength, elongation at break, length (m/kg), twist per metre, extension under specified load and mass and length of sewing thread	All the packages according to col 2 of Table 3	Non-conforming packages not to exceed corresponding number given in col 3 of Table 3
b) Colour fastness, conductivity of aqueous extract, pH value of aqueous extract, water soluble chlorides, water soluble sulphates, shrinkage in boiling water and sewing properties	Two packages for a lot of 300 packages and three above 300	All the packages to satisfy the relevant requirements

## ANNEX A

( Clause 2.1 )

### LIST OF REFERRED INDIAN STANDARDS

IS No.	Title	IS No.	Title
832 : 1985	Methods for determination of twist in yarn ( <i>first revision</i> )	4727 : 1968	Nylon webbing for aeronautical purposes
1066 : 1980	Code for packaging of sewing threads ( <i>first revision</i> )	4802 : 1988	Method for determination of colour fastness of textile materials to dry-cleaning ( <i>first revision</i> )
1390 : 1980	Methods for determination of pH value of aqueous extracts of textile materials ( <i>first revision</i> )	4905 : 1968	Methods for random sampling
2454 : 1985	Methods for determination of colour fastness of textile materials to artificial light (xenon lamp) ( <i>first revision</i> )	4910 (Part 2) : 1989	Methods of test for tyre yarns, cords and tyre cord warp-sheets made from man-made fibres : Part 2 Linear density ( <i>first revision</i> )
3361 : 1979	Method for determination of colour fastness of textile materials to washing : Test 2 ( <i>first revision</i> )	4910 (Part 3) : 1989	Methods of test for tyre yarns, cords and tyre cord warp-sheets made from man-made fibres : Part 3 Breaking load, elongation at break and tenacity ( <i>first revision</i> )
4202 : 1967	Method for determination of chloride content in textile materials	4910 (Part 5) : 1989	Methods of test for tyre yarns, cords and tyre cord warp-sheets made from man-made fibres : Part 5 Heat shrinkage and heat shrinkage force ( <i>first revision</i> )
4203 : 1967	Method for determination of sulphate content in textile materials		
4420 : 1967	Methods for determination of conductivity of aqueous and organic extracts of textile materials		

null, Viewed on 29/08/2022 00:46:20, TCP/IP Address : 192.168.0.189

IS 4229 : 1992

## ANNEX B ( Clause 5.5.1 )

### TEST FOR SEWING PROPERTIES FOR THREADS OF LINEAR DENSITY ABOVE 9 000 METRES PER KILOGRAM

#### B-1 GENERAL

The properties of the fabric on which this test is to be performed shall be according to the agreement between the buyer and the seller.

of stitching at the rate of  $3\ 250 \pm 250$  stitches per minute, maintaining 32 stitches/dm, properly adjusted for tension, 8 mm gauge, and fitted with an appropriate size of needle, shall be used.

#### B-2 TEST SPECIMEN

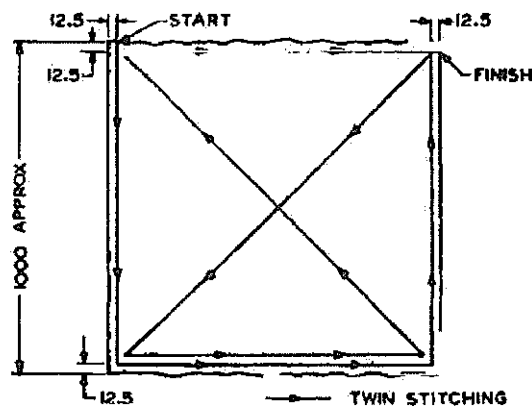
The test specimen shall consist of four full-width lengths, each approximately 1 m long, of nylon parachute fabric laid out in stack.

#### B-4 PROCEDURE

Stitch the test piece at the rate given in B-2 as shown in Fig. 1 lifting the foot and needle but not cutting the thread at the end of each straight run to enable the test piece to be turned. Ignore any slight looping at each corner.

#### B-3 APPARATUS

A twin-needled lockstitch sewing machine capable



All dimensions in millimetres.

FIG. 1 TEST PIECE FOR LIGHT SEWING THREADS

**ANNEX C**  
( Clause 5.5.2 )

**TEST FOR SEWING PROPERTIES FOR THREADS OF LINEAR DENSITY LESS THAN 9 000 METRES PER KILOGRAM**

**C-1 TEST SPECIMEN**

Four test specimens of dyed nylon webbing conforming to IS 4727 : 1968 shall be tested. Each specimen shall consist of the layers of webbing, approximately 45 mm wide and 0.5 m long as given below:

- |  |          |
|--|----------|
| a) For threads of varieties<br>No. H1 and H2 | 2 layers |
| b) For threads of varieties<br>No. H3 and H4 | 3 layers |

**C-2 APPARATUS**

A single-needle lockstitch sewing machine, capable of stitching at the rate of  $250 \pm 40$  stitches per minute, maintaining 20 stitches/dm, properly adjusted for tension and fitted with an appropriate size of needle shall be used. Application of lubricant to the needle is permitted.

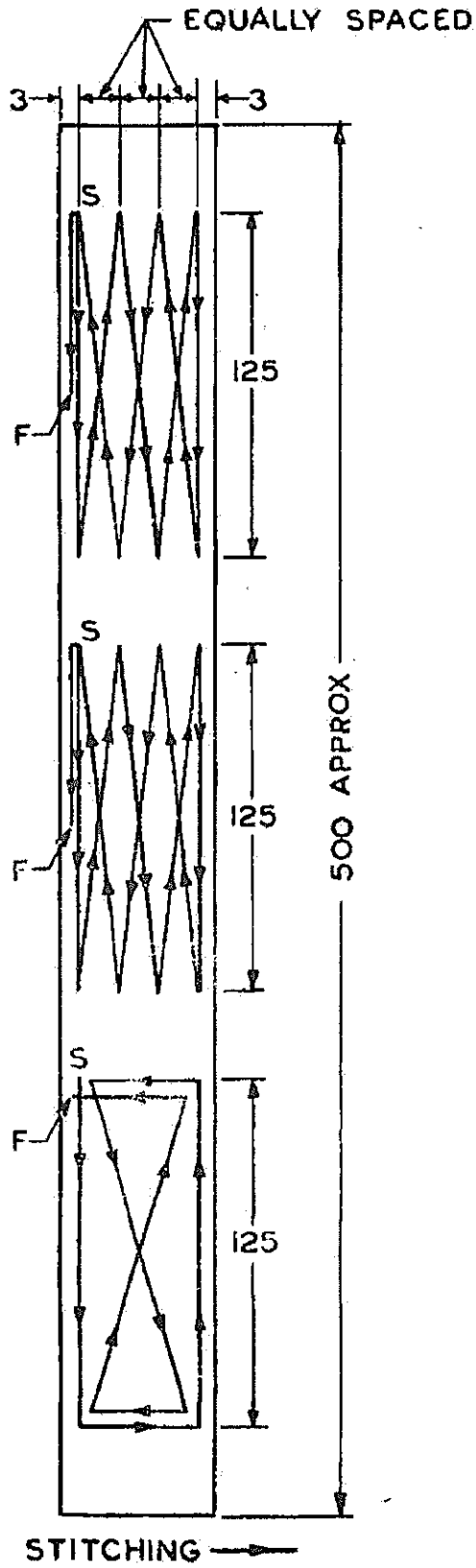
**C-3 PROCEDURE**

Stitch together the webbings of each test piece with two four point double W's and a gate pattern, as shown in Fig. 2.



null, Viewed on 29/08/2022 00:46:20, TCP/IP Address : 192.168.0.189

IS 4229 : 1992



All dimensions in millimetres.

FIG. 2 TEST PIECE FOR HEAVY SEWING THREADS

null, Viewed on 29/08/2022 00:46:21, TCP/IP Address : 192.168.0.189

#### **Standard Mark**

The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

null, Viewed on 29/08/2022 00:46:21, TCP/IP Address : 192.168.0.189

**Bureau of Indian Standards**

BIS is a statutory institution established under the *Bureau of Indian Standards Act, 1986* to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

**Copyright**

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Director (Publications), BIS.

**Revision of Indian Standards**

Indian Standards are reviewed periodically and revised, when necessary and amendments, if any, are issued from time to time. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition. Comments on this Indian Standard may be sent to BIS giving the following reference:

Doc : No TXD 13 (2326)

**Amendments Issued Since Publication**

Amend No.	Date of Issue	Text Affected

**BUREAU OF INDIAN STANDARDS****Headquarters:**

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002  
Telephones : 331 01 31, 331 13 75

Telegrams : Manaksanstha  
( Common to all Offices )

**Regional Offices:**

	Telephone
Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	{ 331 01 31 331 13 75
Eastern : 1/14 C. I. T. Scheme VII M, V. I. P. Road, Maniktola CALCUTTA 700054	{ 37 84 99, 37 85 61, 37 86 26, 37 86 62
Northern : SCO 445-446, Sector 35-C, CHANDIGARH 160036	{ 53 38 43, 53 16 40, 53 23 84
Southern : C. I. T. Campus, IV Cross Road, MADRAS 600113	{ 235 02 16, 235 04 42, 235 15 19, 235 23 15
Western : Manakalaya, E9 MIDC, Marol, Andheri (East) BOMBAY 400093	{ 632 92 95, 632 78 58, 632 78 91, 632 78 92

Branches : AHMADABAD, BANGALORE, BHOPAL, BHUBANESHWAR, COIMBATORE,  
FARIDABAD, GHAZIABAD, GUWAHATI, HYDERABAD, JAIPUR, KANPUR,  
LUCKNOW, PATNA, THIRUVANANTHAPURAM.

Printed at Printrade, New Delhi, India