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BUREAU OF INDIAN STANDARDS
(*New Delhi*)

AGENDA

Textile Materials for Aeronautical and Related Products Sectional Committee, TXD 13 **18th Meeting**

Date	Time	Venue
24th July, 2024	**11:30 AM**	**Online (**Webex Video Conferencing**)**

Chairman: Dr. Manoj Kumar, Director, ADRDE, Agra

Member Secretary: Shri Gourav Mishra Scientist B, BIS

Item 0 WELCOME & INTRODUCTORY REMARKS

Item 1 CONFIRMATION OF THE MINUTES OF THE PREVIOUS MEETING

1.1 The minutes of the 17th meeting of the Committee held on 03 January 2024 through Webex Video Conferencing were circulated vide BIS DG letter no TXD 13/A2.17 dated 01 February 2024 and no comments have been received.

1.1.1 The Committee may **CONFIRM** the minutes as circulated**.**

Item 2 SCOPE AND COMPOSITION OF TXD 13

2.1 The present scope and composition of the Committee is given in **Annex 1 (P 5 - 6).**

2.1.1 The Committee may **DECIDE.**

2.2 As per the directives of competent authority BIS, the memberships of the organizations which did not participated in the last two sectional committee meetings was terminated. The list of all such organizations is given below.

a. Universal Yarns & Tex Private Limited, Kanpur
b. Garware Technical Fibres Limited, Pune
c. Todi & Company Ltd, Mumbai.

2.2.1 The Committee may **NOTE.**

Item 3 ISSUES ARISING OUT OF THE PREVIOUS MEETING

3.1 Summary of actions taken on the various decisions of the 17th meeting is given in **Annex 2 (P 7).**

3.1.1 The Committee may **NOTE**.

Item 4 DRAFT STANDARDS FOR FINALIZATION

4.1 As per the decision taken by the committee in the 16th Sectional committee meeting the below listed revision draft of the Indian standards was wide circulated for the period of 60 days for eliciting technical comments from stakeholders and the same is given in **Annex 3A (P 8-20)** and **Annex 3B (P 21-27).** No comments have been received.

Sl No.	IS No.	Title
1.	TXD 13 (22617) Revision of: IS 3449 : 1984	Textiles Cotton Webbing For Parachutes Specification (*third revision*)
2.	TXD 13 (24731) Revision of: IS 6349 : 1981	Textiles — Tubular Nylon Tapes for Aerospace Applications — Specification (*second revision*)

4.1.1 The committee may **DECIDE**.

4.2 As per the decision taken by the committee in the 17th Sectional committee meeting the below listed revision draft of the Indian standards was wide circulated for the period of 60 days for eliciting technical comments from stakeholders and the same is given in **Annex 3C (P 28-43).**

The comments have been received from M/s **MOTILAL DULICHAND PVT. LTD.** as given in **Annex 4 (P 44).**

Sl No.	IS No.	Title
1.	TXD 13 (24777) Revision of: IS 2196 : 1985	Textiles — Linen Flax Sewing Thread for Aerospace Purposes — Specification (*third revision*)

4.2.1 The committee may **DECIDE**.

Item 5 NEW WORK ITEM PROPOSAL

5.1 In the 16th meeting, the committee decided that BIS shall prepare the draft standard on '**Nylon Tapes for Aircraft Arrester Barrier**' after incorporating the inputs on **UV xenon lamp method** to be provided by M/s ADRDE, Agra and the same shall be issued wide circulation for the period of 60 days. Inputs are still awaited.

5.1.1 The committee may **DECIDE**.

Item 6 REVIEW OF PUBLISHED STANDARDS

6.1 As per procedure of BIS, standards which were published/reaffirmed five years ago are required to be reviewed to assess adequacy of the requirements specified. Review is carried out keeping in view the changes in technology, current industrial practices and the needs/expectations of the consumers/users so as to decide regarding further reaffirmation/ revision/withdrawal/amendment of the standards under review.

The status of Indian standards due for review under the domain of TXD 13 are as follows:

Sl No.	IS No.	Title	Status
1.	IS 714 : 1992	Textiles — Cotton reinforcing tapes for aerospace purposes — Specification (*third revision*)	R&D
2.	IS 3846 : 1984	Specification for rot-proofed cotton tapes for aerospace purposes (*first revision*)	R&D
3.	IS 14564 : 1998	Textiles — Cotton tapes for personnel parachutes — Specification	R&D
4.	IS 1402 : 1992	Textiles — Braided cotton cord for aerospace purposes — Specification (*second revision*)	Under Print
5.	IS 4227 : 1998	Textiles — Braided nylon cords for aerospace purposes — Specification (*second revision*)	Under Print
6.	IS 4229 : 1992	Textiles — Nylon sewing threads for aerospace purposes — Specification (*second revision*)	Under Print
7.	IS 4726 : 1984	Specification for light weight nylon fabric for parachutes	WC is under preparation
8.	IS 3449 : 1984	Specification for cotton webbing for parachutes (*second revision*)	WC Completed
9.	IS 6349 : 1981	Specification for tape, nylon, tubular for aerospace applications (*first revision*)	WC Completed
10.	IS 2196 : 1985	Specification for linen (flax) sewing thread for aeronautical purposes (*second revision*)	WC Completed
11.	IS 1376 : 1998	Textiles — Cotton sewing threads for aerospace purposes — Specification (*third revision*)	ARP Awaited (ADRDE)
12.	IS 514 : 1992	Textiles — Mercerized cotton fabrics for covering aircrafts and gliders — Specification (*third revision*)	ARP Awaited (ADRDE)
13.	IS 11367 : 1985	Glossary of terms relating to textile materials for aerospace purposes	ARP Awaited (ADRDE)

14.	IS 5746 (Part 1) : 1987	Specification for woven glass fibre fabrics for plastic laminates for aerospace purposes — Part 1 Loom-state fabrics (*second revision*)	ARP Awaited (Urja Products)
15.	IS 5746 (Part 2) : 1987	Woven glass fibre fabrics for plastic laminates for aerospace purposes — Part 2 Desized fabrics (*second revision*)	ARP Awaited (Urja Products)
16.	IS 5746 (Part 3) : 1987	Woven glass fibres fabric for plastic laminates for aerospace purposes — Part 3 Finished fabrics for use with polyester resin systems (*second revision*)	ARP Awaited (Urja Products)
17.	IS 10476 : 1983	Specification for woven roving glass fabric for polyester — glass laminates for aerospace purposes	ARP Awaited (Urja Products)
18.	IS 11916 : 2001	Textiles — Continuous filament glass yarn for aerospace and other purposes — Specification (*first revision*)	Committee may DECIDE.
19.	IS 4727 : 2020	Textiles — Nylon webbing for aeronautical purposes — Specification (*first revision*)	Committee may DECIDE.
20.	IS 2197 : 2000	Aerospace textiles — Braided (Plaited) linen (flax) lacing cord — Specification (*second revision*)	Committee may DECIDE.

The detailed review analysis of the IS 11916 , IS 2197 and IS 4727 prepared by BIS is given in **Annex 5A (P 45 - 48) , Annex 5B (P 49 - 53) , Annex 5C (P 54 – 57).**

6.1.1 The committee may **DECIDE**.

Item 7 DATE AND PLACE OF NEXT MEETING

Item 8 ANY OTHER BUSINESS

ANNEX 1

(*Item* 2.1)

Scope and Composition of Textile Materials for Aeronautical and Related Products TXD 13

Scope: To formulate Indian standards for terminology and specifications for textile materials for aeronautical and related products.

Meetings held	**Date and Place**
15th meeting	11 November 2022 through WebEx video conference
16th meeting	11 July 2023 (Hybrid) ADRDE, Agra
17th meeting	03 January 2024 through WebEx video conference

Sl No.	**Organization Represented**	**Name of The representative Principal/ (Alternate)**	**Attendance**
1.	Aerial Delivery Research & Development Estt. Agra	Dr. Manoj Kumar (***Chairperson***)	3/3
2.	Aerial Delivery Research and Development Establishment (DRDO), Agra	Shri Puneet Gupta Shri Prasanta Kumar Mallik (*Alternate*)	3/3
3.	Defence Materials and Stores Research and Development Establishment, Kanpur	Smt Priyanka Katiyar Shri Biswa Ranjan Das (*Alternate*)	1/3
4.	Directorate General of Aeronautical Quality Assurance, Ministry of Defense, New Delhi	Shri Daljeet Singh Dr. Subash (*Alternate*)	2/3
5.	Directorate General of Civil Aviation, New Delhi	Shri Lalit Gupta Nomination Awaited (*Alternate*)	1/3
6.	Directorate General of Quality Assurance, Ministry of Defense, New Delhi	Shri Purushottam De Shri SS Kashyap (*Alternate*)	3/3
7.	Indian Space Research Organization - Vikram Sarabhai Space Centre, Thiruvananthapuram	Dr Santhosh B Shri Anil Painuly (*Alternate*)	3/3
8.	Kusumgar Corporates Private Limited, Vapi	Shri Siddharth Y Kusumgar Dr M. K. Talukdar (*Alternate*)	3/3
9.	Motilal Dulichand Private Limited, Kanpur	Shri Shailendra Misra Shri Sunil Prahladka (*Alternate*)	3/3
10.	Northen Indian Textile Research Association, Ghaziabad	Dr M S Parmar	0/0

11.	Office of the Textile Commissioner, Mumbai	Shri Humayun K Shri Jamil Ahmed (*Alternate*)	2/3
12.	Ordnance Parachute Factory, Kanpur	Shri K K Toppo Shri Sachin Khoria (*Alternate*)	3/3
13.	Oriental Weaving & Processing Mills Pvt Ltd, Navi Mumbai	Smt Smita Yeole Shri Saurabh Phadtare (*Alternate*)	2/3
14.	Ratanmoti Texfab (India) Pvt Ltd, Ichalkaranji	Shri Ritesh Naval Patni Shri Shubham Vidyadhar Kharage (*Alternate*)	0/0
15.	RCMA, Kanpur	Nomination Awaited Shri Alok Kumar (*Alternate*)	1/3
16.	Shingora Textiles Limited, Ludhiana	Shri Amit Jain Shri Tej Narayan (*Alternate*)	0/0
17.	SRF Private Limited, Chennai	Ms Angelina Divya Shri Ankur Sharma (*Alternate*)	3/3
18.	Swadeshi Niwar Mills, Kanpur	Shri Yash Khandelwal Shi Vineet Khandelwal (*Alternate*)	0/0
19.	Thanawala and Company, Mumbai	Shri Hemal M Thanawala Shri Vivaan Thanawala (*Alternate*)	3/3
20.	The Synthetic and Art Silk Mills Research Association, Mumbai	Dr. Manisha Mathur Smt. Ashwini Sudam (*Alternate*)	3/3
21.	Urja Products Private Limited, Ahmedabad	Shri Anshul Nanavaty	3/3
22.	Uttar Pradesh Textile Technology Institute, Kanpur	Prof. Mukesh Kumar Singh	2/3
23.	Vardhaman Yarn and Threads Limited, Gurgaon	Shri Anu Handa	2/3
24.	Viraj Syntex Pvt Ltd, Kanpur	Shri Amit Singh Ankit Kushwaha (*Alternate*)	1/3

ANNEX 2
(*Item* 3.1)

SUMMARY OF ACTIONS TAKEN ON THE MINUTES OF THE LAST MEETING

Item No.	Decision	Action taken
2.1	Changes in scope and composition of TXD 13	Updated scope and composition are given in Annex 1.
4	**DRAFT STANDARDS FOR FINALIZATION** IS 4229 : 1998 Textiles — Nylon sewing threads for aerospace purposes Specification (second revision) IS 4227 : 1992 Textiles — Braided nylon cords for aerospace purposes Specification (second revision) IS 1402 : 1992 Textiles — Braided Cotton Cord for Aerospace Purposes — Specification (third revision)	Under Printing
5	**RESEARCH AND DEVELOPMENT PROJECT** Study on effect of constructional parameters on performance of cotton tapes for Aeronautical Applications	R & D project ToR approved, and project is on offer
6	**REVIEW OF PUBLISHED STANDARDS** a) IS 11326 : 1985 Specification for nylon fabrics for coating with natural or synthetic elastomers b) IS 4719 : 1984 Specification for wire-woven rayon fabric for aerospace purposes (*second revision*)	Archived
8	**ANY OTHER BUSINESS** IS 2196 : 1985 Textiles — Linen Flax Sewing Thread for Aerospace Purposes — Specification (*third revision*)	Coming up for discussion under agenda item 4.2

ANNEX 3A
(Item 4.1)

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDRADS

Draft for comments only Doc No.: TXD 13 (22617)
November 2023

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भारतीय मानक मसौदा
वस्त्रादि — पैराशूट के लिए कपास के वेबिंग — विशिष्टि

(IS 3449 का *तीसरा पुनरीक्षण*)

Draft *Indian Standard*
TEXTILES — COTTON WEBBING FOR PARACHUTES — SPECIFICATION

(*Third Revision* of IS 3449)

ICS : 49.025.60

Textile Materials for Aeronautical Applications Sectional Committee, TXD 13	Last date for receipt of comments is 28 January 2024

FOREWORD

(Formal clauses will be added later)

This standard was first published in 1966 and was subsequently revised in 1979 and 1984. The third revision has been made in the light of experience gained since its publication and to incorporate the following major changes:

a) Requirement for colour fastness to dyed cotton webbing has been modified;
b) Sampling and marking clauses have been updated; and
c) References to the 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 for two types of cotton webbing mainly used in the fabrication of man-dropping 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 editions of the standards listed in Annex A.

3 TYPES

The cotton webbings shall be of following two types depending upon their widths:

a) *Type I* — Cotton webbing having width of 38 mm.
b) Type II — Cotton webbing having width of 75 mm.

4 MANUFACTURE

4.1 The webbing shall be manufactured from unsized cotton yarns of nominal counts as follows:

a) Warp — 3 ply yarn of resultant count 150 tex; and
b) Weft — 3 ply yarn of resultant count 90 tex.

4.2 The weave of the cotton webbing shall be 2/2 V twill.

5 FINISH

5.1 Condition of Material

The webbing shall be supplied in one of the following conditions:

a) Loomstate;
b) Scoured and rot-proofed; and
c) Scoured, dyed and rot-proofed.

5.2 Dyeing

If dyeing is required, the colour shall be as stated in the contract or order and either the webbing or the yarns from which it is to be manufactured shall be dyed. Sulphur dyes shall not be used. The rotproofing treatment by LPCP or PCPL as stated in **5.3** may be given subsequently.

5.3 Rot-Proofing

If rot-proofing is required, the webbing or the yarns from which it is to be manufactured shall be evenly and thoroughly impregnated with a solvent solution or aqueous emulsion of lauryl pentachlorophenol (LPCP) or of pentachlorophenyl laurate (PCPL). This shall be followed by removal of the excess and subsequent drying or thorough solvent removal. The treated textile shall be dry in handling and non-tacky. The LPCP or PCPL content of the treated textile when tested

according to the methods prescribed in IS 3522 (Part 2) or Annex A shall not be less than 1.7 percent and not more than 2.5 percent on the oven dry mass of the textile material. The free pentachloro phenol content of the treated textile shall not exceed 10 percent of the LPCP or PCPL content (*see* Note under **B-3**).

5.4 Freedom from Defects

In case of webbing to be used for personnel parachutes, each roll shall be visually examined metre by metre for the defects as given in Annex C. The roll shall be acceptable only if it is free from these defects.

6 REQUIREMENTS

6.1 The cotton webbings shall meet the physical and chemical requirements as given in Tables 1 and Table 2.

Table 1 Physical Requirements of Cotton Webbing for Parachutes
(*Clause* 6.1)

Type	**Length of Roll, m, *Min***	**Width, mm**	**Ends In Full Width**	**Picks Per cm**	**Mass, g/m, *Max***	**Breaking Load, Warpway (20 cm ×Full Width), N, *Min***
(1)	(2)	(3)	(4)	(5)	(6)	(7)
I	100 or as ordered	38	112	12	27	1 815
II	100 or as ordered	75	222	12	50	3 675
Tolerance	—	± 1.5 mm	+4 mm −0 mm	± 1	—	—
Method of Test, Ref to	Annex D	Annex E	IS 1963		Annex F	IS 1969 (Part 1)

Table 2 Chemical Requirements of Cotton Webbing for Parachutes
(*Clause* 6.2)

Sl No.	**Characteristic**	**Requirements for Types I and II**	**Method of Test, Ref to**
(1)	(2)	(3)	(4)
i)	Colour fastness to:		

	a) Light b) Washing, Test C (3)	5 or better 4 or better	IS/ISO 105-B01 or IS/ISO 105-B02 IS/ISO 105-C10
ii)	Scouring loss, percent, *Max*	3	IS 1383
iii)	Water soluble matter, percent, *Max*	1	IS 3456

7 MARKING

7.1 Each roll shall carry the following information:

a) Name of the manufacturer/trade-mark;
b) Length and width (mm) of material;
c) Type;
d) Length/roll (m); and
e) Month and year of manufacture.

7.2 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.

8 PACKING

8.1 Unless otherwise agreed to between the buyer and the seller, the webbings shall be packed as given in **8.2**.

8.2 Webbing rolls, individually wrapped in polyethylene (*see* IS 2508) or water proof paper (*see* IS 1398), shall be tightly packed in heavy cee jute cloth (*see* IS 3751) to form a bale not exceeding 50 kg in gross mass.

8.3 Each bale shall be marked with the details of the consignment as provided in the contract or order in addition to the marking given in **7.1.**

9 SAMPLING

9.1 Lot

All the rolls of webbing purporting to be of one definite type and quality delivered to one buyer against one despatch note shall constitute a lot.

9.2 The conformity of the lot to the requirements of this standard shall be determined on the basis of tests carried out on the samples selected from the lot.

9.3 Unless otherwise agreed to between the buyer and the seller, the number of rolls to be selected at random from a lot shall be in accordance with col 2 of Table 3.

Table 3 Sample Size and Criteria for Conformity

(*Clause* 9.3)

Sl No.	Lot Size (Number Of Rolls)	Sample Size (Number of Rolls To Be Selected)	Permissible Number Of Non-Conforming Rolls	Sub-Sample Size (Number of Rolls to be Selected)
(1)	(2)	(3)	(4)	(5)
i)	Up to 100	10	1	5
ii)	101 to 300	15	1	6
iii)	301 to 500	25	2	7
iv)	501 to 800	35	3	8
v)	801 to 1 300	50	4	9
vi)	1 301 and above	75	6	10

9.4 For evaluating (a) ends in full width and picks per cm, (b) width, and (c) length, the rolls selected as in col 3 of Table 3 shall constitute the test sample.

9.5 For evaluating (a) mass, (b) breaking load, (c) water soluble matter, (d) scouring loss, and (e) colour fastness, the number of rolls specified in col 5 of Table 3 shall constitute the test sample. These rolls shall be selected at random from those selected in col 3 of Table 3. The required number of test specimens shall be drawn from each roll and subjected to corresponding tests.

NOTE — In the case of breaking load tests, at least 10 representative test specimens shall be drawn from each roll for the purpose of tests.

9.6 Criteria for Conformity — The lot shall be considered to be inconformity with the requirements of this standard if the following conditions are satisfied;

a) The number of rolls found non-conforming with respect to (i) ends in full width and picks per cm, and (ii) width does not exceed the corresponding number given in col 4 of Table 3.

b) In the case of length, the value obtained for each roll shall be compared with its declared or marked length. The mean percentage of deficiency in length, if any, shall be determined and made applicable to the lot.

c) From the observed values of mass, the average $\bar{X}$ and the range R shall be calculated and the value of the expression $\bar{X}$ + 0.6 R shall be less than or equal to the specified value.

d) From the observed values of breaking load tests in respect of each roll in the test sample, the average breaking load value shall be calculated. From all such average breaking load values the grand average $\bar{X}$ and the range R shall be calculated and the value of the expression $\bar{X}$ - 0.6 R shall be greater than or equal to the specified value.

NOTES

1 The average breaking load value for a roll is the value obtained by dividing the sum of the observed values in respect of the test specimens taken from the roll by the number of test specimens. Grand average is the value obtained by dividing the sum of the average breaking load values in respect of the rolls in the test sample by the number of rolls tested.

2 Range R is the difference between the maximum and the minimum in a set of average breaking load values for the rolls tested.

e) From the observed values of water soluble matter, the average $\bar{X}$ and the range R shall be calculated and the value of the expression $\bar{X}$ + 0.6 R shall be less than or equal to the specified value.

f) From the observed values of scouring loss, the average X and the range R shall be calculated and the value of the expression $\bar{X}$ + 0.6 R shall be less than or equal to the specified value.

NOTES
1 Average is the value obtained by dividing the sum of the observed values by the number of tests.
2 Range R is the difference between the maximum and the minimum in a set of observed values.

g) The colour fastness ratings obtained on tests satisfy the corresponding requirements.

h) In case of webbing used for personnel parachutes, each roll shall be visually examined metre by metre for the defects given in Annex C and it shall be acceptable only if it is free from these defects.

ANNEX A

(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
IS 196 : 1966	Atmospheric conditions for testing (*revised*)
IS 667 : 1981	Methods for identification of textile fibres (*first revision*)
IS 1383 : 1977	Methods for determination of scouring loss in grey and finished cotton textile materials (*first revision*)
IS 3456 : 2022	Method for determination of water-soluble matter of textile materials (*first revision*)
IS 1398 : 1982	Specification for packing paper water proof, bitumen — laminated (*second revision*)
IS 1963 : 1981	Methods for determination of threads per length in woven fabrics (*second revision*)
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 (*fourth revision*)
IS 2508 : 2016	Polyethylene films and sheets — Specification (*third revision*)
IS 3522 (Part 1) : 1989	Methods for estimation of common preservatives on textiles — Part 1 (*first revision*)
IS 3522 (Part 2) : 1989	Textiles — Estimation of common preservatives — Part 2
IS 3751 : 1993	Textiles — Heavy cee jute cloth — Specification (*first revision*)
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* 5.3)

DETERMINATION OF PENTACHLOROPENYL LAURATE (PCPL) CONTENT

B-1 GENERAL

The method is applicable to the determination of PCPL in the absence of added pentachlorophenol. The proofing is hydrolyzed, acidified and steam distilled and the pentachlorophenol in the distillate extracted with 1, 1, 1-trichloroethane and complexed with copper sulphate-pyridine reagent. The optical density of the complex in1, 1, 1-trichloroethane is measured on a suitable sepctrophotometer at 450 nm.

B-2 REAGENTS

B-2.1 Ethanediol (ethylene glycol);

B-2.2 1, 1, 1-trichloroethane;

B-2.3 Pridine (AR, GPR grade);

B-2.4 Sodium hydroxide, pellet;

B-2.5 Copper sulphate reagent solution 50 g/1;

B-2.6 Pentachlorophenol (standard reagent), melting point 180 °C minimum; and

B-2.7 Hydrochloric acid, concentrated 36 percent (*m/v*) (11 M).

B-2.8 Copper Sulphate — pyridine reagent prepared by mixing 4 ml pyridine with 6 ml copper sulphate solution immediately before use.

B-3 PROCEDURE

Weigh 2.5 g ± 0.05 g of the material, cut into small pieces of not more than 5 mm square and place in a dry 250 ml round flask (B 24/29 socket). Add 30 ml of ethanediol, 4 g of sodium hydroxide (pellet form), 2 ml to 4 ml of water in, that order and a few anti bumping granules. Connect the flask with a double surface condenser, bring the contents to boiling point on a sand bath and boil them vigorously for 30 min under reflux. After this allow the contents of the flask to cool, remove the reflux condenser and add through a funnel 60 ml water followed by 20 ml hydrochloric acid.

Steam distill the contents of the flask ensuring that a constant volume is maintained by applying gentle heat as necessary. Collect 300 ml of distillate in a suitable receiver, applying care to prevent loss of pentachlorophenol in the distillate by adequate cooling. Discontinue the external heating of the flask a few minutes before disconnecting the steam supply. Disconnect the condenser and fit it vertically over the distillate receiver. Wash down the condenser with 25 ml to 30 ml of trichloroethane and collect the washing in the distillate. Transfer the distillate and trichloroethane washings to a 500 ml separating funnel and shake thoroughly. Allow the layers of water and trichloroethane to separate completely before running off the trichloroethane layer into a 100 ml separating funnel. Wash the condenser and distillate receiver with a further 25 ml to 30 ml trichloroethane and add this to the aqueous solution into the 500 ml separating funnel. Repeat the extraction as given above and add the trichloroethane layer to the first trichloroethane extract in the 100 ml separating funnel. Add to the bulked trichloroethane extract 10 ml of copper sulphate-pyridene reagent and shake well. After complete separation of the aqueous and trichloroethane layers, run the lower trichloroethane layer into a 100 ml volumetric flask via a small funnel containing anhydrous sodium sulphate supported by means of a quartz wool plug. Add a small quantity of trichloroethane to the copper sulphate-pyridine solution remaining in the separating funnel, shake and allow the layers to separate. Filter the trichloroethane layer through quartz wool plug and collect in the volumetric flask. Wash the filter with further small quantities of trichloroethane and finally make up to 100 ml trichloroethane.

Determine the optical density of the solution using a suitable spectrophotometer at 450 nm using trichloroethane as a blank. Estimate the PCPL content by reference to a calibration graph prepared from known standards of pentachlorophenol (1.0 percent pentachlorophenol = 1.71 percent PCPL).

NOTE — If the proofing is expected to contain both pentachlorophenol and PCPL then the free pentachlorophenol content should be determined as given in IS 3522 (Part 1) and the amount found deducted from the apparent PCPL content.

B-4 CALIBRATION

B-4.1 Direct — Prepare a calibration graph using 5 ml, 10 ml, 15 ml aliquots of a standard solution of pentachlorophenol reagent (1 g/200 ml) in trichloroethane to cover a range of 1, 2 and 3 percent respectively. Dilute each aliquot to 50 to 60 ml with trichloroethane, add 10 ml of copper sulphate-pyridine reagent, shake well and then follow the described procedure. Plot optical density against concentration of PCPL.

B-4.2 Indirect — Prepare a calibration graph using 5 ml, 10 ml, 15 ml aliquots of a standard solution of pentachlorophenol reagent (1 g/200 ml) in dilute sodium hydroxide solution (sufficient for complete solution of pentachlorophenol). Place each aliquot in a round bottomed flask, add 60 ml water and 20 ml hydrochloric acid. Fit the flask for steam distillation and then follow the described procedure. If the distillation technique is satisfactory then the graphs obtained as in **B-4.1** and **B-4.2** should be the same.

ANNEX C

[*Clauses* 5.4 and 8.6 (h)]

CLASSIFICATION OF MAJOR DEFECTS

C-1 Width Deviation — Any part outside the limits specified in this standard.

C-2 Warp Bow — Any part in which the warp bow when measured on a 1 m length exceeds 10 mm.

C-3 Slack or Unevenly Woven Selvedges — Any part that does not lie flat and even or shows a distinct 'saw tooth' effect.

C-4 Cut, Broken or Missing Threads — Two or more in warp or weft regardless of length.

C-5 Knots in Warp Ends or Weft Picks — One or more.

C-6 Floats — Any float affecting more than two ends and extending more than 6.5 mm.

C-7 Pick Variation — Variation outside the tolerances specified in this standard other than slight local variation.

C-8 Mechanical Damage, Abrasion Marks — Any damage affecting the breaking load.

C-9 Inclusions — Any hard or soft foreign bodies which cause appreciable added thickness.

C-10 Cut, Hole or Tear — Three or more warp or weft threads ruptured at adjoining points.

C-11 Loop, Kinks, Snarls (Except Selvedges) — All over 3 mm in length.

C-12 Selvedge, Cut, Broken, Torn, Scalloped — Any cut, broken, torn or scalloped selvedge.

C-13 Spot, Stain or Streaks — (a) Single ends or picks 40 cm or more in length, and (b) Double ends or picks 20 cm or more in length.

ANNEX D

(*Table* 1)

METHOD FOR DETERMINATION OF LENGTH OF ROLL

D-1 TEST SPECIMENS

D-1.1 For the purpose of this test, all the rolls in the test sample (*see* **9.4**) shall constitute the test specimens.

D-2 EQUIPMENT

D-2.1 A flat table, little over 5 m long, having a smooth horizontal surface with markings in metres and centimetres on one side, shall be used.

D-3 PROCEDURE

D-3.1 Unroll one test specimen, draw one of its ends across the full length of the table and smoothen the portion of the webbing on the table with no greater tension than is necessary to make it lie straight and flat.

D-3.2 Mark on the webbing the first 5 m length as measured against the mark on the table. Measure the entire length, correct to a centimetre against the markings on the table.

D-3.3 Compare the value obtained in **D-3.2** with the declared or marked length of the roll and note the deficiency in length, if any.

D-3.4 Repeat the test with the remaining test specimens and calculate the mean percentage deficiency in length, if any.

ANNEX E
(*Table* 1)

METHOD FOR DETERMINATION OF WIDTH OF THE WEBBING

E-1 TEST SPECIMENS

E-1.1 For the purpose of this test, all the rolls in the test sample (*see* **9.4**) shall constitute the test specimens.

E-2 PROCEDURE

E-2.1 Unroll one test specimen and lay a portion of it on a horizontal surface and smoothen it out with no greater tension than is necessary to make it lie straight and flat.

E-2.2 Measure to an accuracy of 1 mm the width of the webbing by means of a graduated steel scale placed at right angles to the selvedges.

E-2.3 Determine similarly the width of the webbing at 5 different places uniformly distributed along the length of the roll. Calculate the mean of the 5 test values.

E-2.4 Repeat the test with the remaining test specimens.

E-3 REPORT

E-3.1 Report the lot to be in conformity with the relevant requirements of Table 1 if the number of rolls whose width varies by more than the tolerance prescribed in the Table 1 is not more than the corresponding number given in col 4 of Table 3.

ANNEX F
(*Table* 1)

METHOD FOR DETERMINATION OF MASS

F-1 TEST SPECIMENS

F-1.1 Cut a piece of webbing approximately 4 m in length from each of the rolls constituting sample under test (*see* **9.5**).

F-2 CONDITIONING OF TEST SPECIMENS

F-2.1 Prior to test, the test specimens shall be conditioned in a standard atmosphere at (65 ± 2) percent relative humidity and (27 ± 2) °C temperature (*see* IS 196) for 48 hours.

F-3 PROCEDURE

F-3.1 Take a test specimen and apply a tension equal to one percent of the minimum specified breaking load of the webbing (*see* Note). After (60 ± 5) s , place two marks on the webbing 3 m apart.

NOTE — The tension may be applied in a breaking load testing machine. It may also be applied by fixing one end of the webbing to a peg, passing the webbing around a pulley and hanging the desired load at the other end.

F-3.2 Release the load and cut the test specimen at the marks and then determine its mass to the nearest 0.1 g.

F-3.3 Calculate the mass of the webbing by the following formula:

$$W = \frac{W_1}{3}$$

where

W = mass, the webbing (g/m); and
W_1 = mass (g) of 3 m length of the webbing (*see* **F-3.2**).

F-3.4 Repeat the test with the remaining test specimens (*see* **F-1.1**).

F-4 REPORT

F-4.1 Report the lot to be in conformity with the relevant requirements of Table 1 if the condition prescribed in **9.6** (c) is satisfied.

ANNEX 3B
(Item 4.1)

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS

Draft for comments only Doc No.: TXD 13 (24731)
January 2024

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भारतीय मानक मसौदा
वस्त्रादि — वायु आकाशीय प्रयोजनों के लिए ट्यूबलर नायलॉन टेप — विशिष्टि

(IS 6349 का *दूसरा पुनरीक्षण*)

Draft *Indian Standard*

TEXTILES — TUBULAR NYLON TAPES FOR AEROSPACE APPLICATIONS — SPECIFICATION

(Second Revision of IS 6349*)*

ICS : 49.025.60

Textile Materials for Aeronautical and Related Products Sectional Committee, TXD 13	Last date for receipt of comments is 30 March 2024

FOREWORD

(*formal clauses will be added later*)

This standard was first published in 1979 and subsequently revised in 1981. This revision has been made in the light of experience gained since its last revision and to incorporate the following major changes:

i) Requirement for elongation at break has been modified;
ii) Packing and marking clauses have been updated; and
iii) References to the 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 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 editions of these standards.

3 TYPES

The types of tubular nylon tapes based on number of plies in the yarn shall be as follows:

Sl No.	Type	No. of Plies in Warp	No. of Plies in Weft
(1)	(2)	(3)	(4)
i)	*Type I*	8 or 2 or 1	4 or 1
ii)	*Type II*	2 or 1	5 or any No. of ply, the resultant tex (denier) should be 117 tex (1 050 d)

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.	Count, Tex (Denier)	Tenacity, g/Tex (g/Denier)
(1)	(2)	(3)
i)	23.3 (210)	54 (6)
ii)	93.3 (840)	72 (8)

iii)	186.6 (l 680)	72 (8)
Tolerance	+10 $percent$ −5 $percen$t	+10 $percent$ −5 $percen$t
Method of Test, Ref to :	IS 4910 (Part 2)	

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 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.

Table 1 Requirements for Tubular Nylon Tape for Aerospace Applications
(*Clause* 5.1)

Sl 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)	Width, mm Tolerance in mm	23^{+2}_{-0}		
iii)	Thickness, mm, *Max* under a pressure of 200 g/cm²	2.3	1.5	lS 7702
iv)	Ends in full width, *Min*	160	206	IS 1963
v)	Picks/dm, *Min*	100	170	
vi)	Mass, g/m^2, *Max* (*see* Note 1)	39	12	IS 1964

vii)	Breaking load in full width × 20 cm between grips, N, *Min* (*see* Note 2)	13 377	2 352	IS 1969 (Part 1)
viii)	Elongation at break, *Min* (*see* Note 1)	18 percent		
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)]

NOTES

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

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

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.

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 jute twine 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 :

a) Length (m), width (mm) and thickness (mm);
b) 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 4 of Table 2 shall be drawn from the sample rolls selected according to col 3 of the Table 2.

Table 2 Scale of Sampling

(*Clause* 8.1)

Sl No.	No. of Rolls in the Lot	Sample Size	Permissible no. of defective rolls in respect of tests on	Sub-Sample Size	Permissible no. of defective rolls in respect of tests on

			sample rolls		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 1000	50	1	9	
vii)	Above 1000	80	2	10	

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* **7.2.2**) shall be taken if so, specified in the contract.

Table 3 Number of Test Specimens and Criteria for Conformity

(*Clause* 9.1)

Sl No.	Characteristics	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 Table 2.	Non-conforming rolls not to exceed corresponding number given in col (4) of Table 2.
ii)	Breaking load, elongation, ageing, colour fastness, shrinkage	According to col (5) of Table 2.	All the rolls to satisfy the relevant requirements.

ANNEX A

(*Clause* 2)

LIST OF REFERRED STANDARDS

IS No.	*Title*
IS 832 (Part 1) : 2021	Textiles — Determination of Twist in Yarns Part 1 Direct Counting Method (*third revision*)
IS 1398 : 1982	Specification for packing paper water proof, bitumen-laminated (second revision)
IS 1912 : 2023	Textiles country jute twine — Specification (*third revision*)
IS 1954 : 1990	Determination of length and width of woven fabrics – methods (s*econd revision*)
IS 1963 : 1981	Methods for determination of threads per unit length in woven fabrics (*second revision*)
IS 1964 : 2001	Textiles – Methods for determination of mass per unit length and mass per unit area of fabrics (*second revision*)
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 (*fourth revision*)
IS 2508 : 2016	Polyethylene films and sheets – Specification (*third revision*)
IS 2977 : 1989	Fabrics (other than wool) — Method For determination of dimensional Changes on soaking in water (*first revision*)
IS 4727 : 2020	Textiles – Nylon webbing for aeronautical purposes – Specification (*first revision*)
IS 4910 (Part 2) : 2023	Tyre yarns, cords and tyre cord fabrics made from man-made fibres — methods of test Part 2 Linear density (*second revision*)
IS 5762 : 1970	Methods for determination of melting point and melting range
IS 6359 : 2023	Method for conditioning of textiles (*first revision*)
IS 7702 : 2012	Textiles — Determination of thickness of textiles and textile products (*first revision*)
IS 9267 : 2021	Textiles - Tubular nylon webbing for aerospace purposes - Specification (*first revision*)
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 : 2014	Textiles - Tests for colour fastness Part C10 Colour fastness to washing with soap or soap and soda

ANNEX 3C

(Item 4.1)

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS

Draft for comments only Doc No.: TXD 13 (24777)
February 2024

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भारतीय मानक मसौदा
वस्त्रादि — वायु आकाशीय प्रयोजनों के लिए लिनन का सिलाई धागा — विशिष्टि

(IS 2196 का *तीसरा पुनरीक्षण*)

Draft *Indian Standard*
TEXTILES — LINEN (FLAX) SEWING THREAD FOR AEROSPACE PURPOSES — SPECIFICATION

(*Third Revision* of IS 2196)

ICS : 49.025.60

Textile Materials for Aeronautical and related Products Sectional Committee, TXD 13	Last date for receipt of comments is **06 April 2024**

FOREWORD

(*Formal clauses will be added later*)

This Standard was first published in 1962 and subsequently revised in 1966 and 1985. This revision has been made in the light of experience gained since its publication and to incorporate the following major changes:

a) Tolerance for the universal count of sewing thread has been modified;
b) Sampling and marking clauses have been updated; and
c) References to the 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 constructional details and other particulars of three varieties of linen (flax) sewing thread for aerospace purposes which are to be used for all sewing operations.

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 TERMINOLOGY

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

3.1 Linen Count — The number of 300 yd hanks per pound.

3.2 Universal Count, in tex — A number indicating the mass in grams of one kilometre length of yarn.

4 CONDITIONING AND TESTING

4.1 Unless otherwise specified in the individual test procedure, all test samples or specimens cut therefrom shall be freely exposed in standard atmosphere of 65 percent ± 2 percent relative humidity and a temperature of 27 °C ± 2 °C for not less than 24 hours (*see also* IS 6359).

4.2 Unless otherwise specified in the individual test procedure, the conditioned test specimens as obtained in **4.1** shall be tested in the standard atmosphere of 65 percent ± 2 percent relative humidity and 27 °C ± 2 °C temperature.

5 GENERAL REQUIREMENTS

5.1 Yarn

The sewing thread shall be manufactured from linen (flax fibre) (Linum usitatissimum) and shall be evenly spun. It shall be uniform in thickness throughout and shall be reasonably free from defects, such as slubs, knots, kinks, projections, broken or loose ends and other manufacturing imperfections which would affect its appearance or serviceability. It shall work satisfactorily in hand or power-driven sewing machines.

6 FINISH

6.1 General

The thread shall be supplied in one of the following conditions:

a) undyed and rot-proofed;
b) undyed, rot-proofed and wax finished;
c) dyed and rot-proofed; and
d) dyed, rot-proofed, and wax finished.

6.2 Rot-proofing

6.2.1 The thread shall be treated with pentachlorophyenyl laurate (PCPL) from aqueous emulsion according to the procedure given in Annex B.

6.3 Dyeing

6.3.1 If the thread is required to be dyed, it shall be dyed with suitable dyes to shades as agreed to between the buyer and the seller.

6.3.2 Sulphur dyes shall not be used.

6.3.3 Dyes known to accelerate actinic damage shall not be used.

NOTE — The following are the colour index numbers of some of the dyestuffs that are known to accelerate actinic damage:
Vat yellow 2, 3, 4, 9, 11, 14, 18, 21, 26 and 28
Vat orange 1, 2, 5, and 9
Vat reds l, 2, 42, 47 and 48
Vat brown 5
Vat violet 2

6.3.4 The dyed thread shall meet the requirements of colour fastness to light and washing as given in Table 1.

Table 1 Colour Fastness Ratings
(*Clause* 6.3.4)

Sl No.	Characteristic	Numerical Rating	Method of Test
(1)	(2)	(3)	(4)
i)	Colour fastness to: a) Light	5 or better	IS/ISO 105-B02
ii)	b) Washing, Test C (3)	4 or better	IS/ISO 105-C10

6.4 Wax Finishing

6.4.1 Where wax finishing of the thread is required, bees wax substitute micro-crystalline hydrocarbon wax shall be used and the mass added by the wax finishing shall be 20 percent ± 5 percent.

6.4.1.1 Prior to waxing, the threads shall have been rot-proofed in accordance with **6.2**.

6.5 Surface Finish

6.5.1 Thread supplied in accordance with **6.1** (a) or **6.1** (c) shall have a soft and smooth finish but substances which may promote microbiological growth (for example, starch or modified starch) shall not be applied.

6.6 Residual Alkali Solubility

6.6.1 The residual alkali solubility of the sewing thread, when determined according to method given in Annex C, shall not exceed 10 percent.

6.7 *p*H of Aqueous Extract

6.7.1 The *p*H of the aqueous extract of the thread when tested according to IS 1390 shall not be less than 6.0 nor more than 8.5.

7 CONSTRUCTION AND OTHER REQUIREMENTS

7.1 The thread shall comply with the requirements given in Table 2 unless vat dyed thread is supplied in which case the minimum breaking strengths given in Table 2 shall be reduced by 10 percent.

Table 2 Constructional Particulars of Linen (Flax) Sewing Thread for Aerospace Purposes
(*Clause* 7.1)

Sl No.	Variety No. (*see* Note)	Universal Count in Tex (or Linen Count)	Direction of Twist	Length, in m Per kg of Finished Thread	Breaking Strength, on 50 cm Test Length of Finished Thread, Kg (N), *Min*	
					Unwaxed	Waxed
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i)	1 or 1R	92 tex × 3 (or 18s/3) ± 10 percent	S/Z	3 620 ± 170	9.2 (90)	7.7 (75)
ii)	2 or 2R	42 tex × 3 (or 40s/3) ± 10 percent	S/Z	7 940 ± 340	3.7 (36)	3.1 (30)
iii)	3 or 3R	92 tex × 8 (or 18s/8) ± 10 percent	Z/S	1 360 ± 80	27.0 (265)	23.0 (225)
Tolerance		± 10 percent	—	—	—	—
Method of Test		IS 1314 for universal count (for linen count *see* Note 2)	-	Annex D	IS 1670	

NOTES

1 The suffix R indicates that the thread has been rot-proofed.

2 For converting universal count in tex to linen count divide 1 654 by the value obtained for universal count in tex.

7.2 Balance of Twist

7.2.1 When approximately 1.5 m length of sewing thread is extended between the hands and the ends brought together slowly, the loop so formed shall not kink, double or re-twist. A maximum of 5 turns in the loop shall, however, be permissible.

8 SEALED SAMPLE

8.1 If, in order to illustrate or specify, the type of finish, feel, etc, of sewing thread, a sample as agreed upon between the buyer and the seller shall be sealed, the supply shall be in conformity with the sample in such respects.

9 IDENTIFICATION

9.1 The thread shall be identified for ordering purposes by the number of this Indian Standard together with the finish and, if required, dyed the colour. This identification may be codified. For example, thread required dyed khaki and rot-proofed may be identified as Indian Standard 2196/ Khaki/PCPL.

10 PACKAGING

Linen sewing thread shall be compactly wound in the form of reels, cheeses, etc, as agreed to between the buyer and the seller in lengths of 500 m.

11 MARKING

11.1 All packages shall be wrapped in kraft paper and marked with the following information:

a) Name of the material;
b) Variety No.;
c) Length;
d) Colour fastness ratings in the case of dyed thread;
e) Manufacturer's name, initials or trade-mark; and
f) Month and year of manufacture.

11.2 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.

11.3 For sewing threads supplied in packages of 250 g and above, the marking shall be on each individual pacakage. Packages less than 250 g shall be boxed and the markings shall be on the outside of the box.

12 PACKING

12.1 Unless otherwise agreed to between the buyer and the seller, the sewing threads shall be packed as given in **12.2.**

12.2 The packages shall be packed in cardboard cartons or wooden cases of suitable size. The weight of a cardboard carton or wooden case, when packed, shall not exceed 50 kg.

13 SAMPLING

13.1 Lot

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

13.2 The conformity of a lot to the requirements of this standard shall be determined on the basis of the tests carried out on the samples selected from the lot.

13.3 Unless otherwise agreed to between the buyer and the seller, the number of reels, cheeses, etc, to be selected at random from the lot shall be in accordance with col 2 of Table 3.

Table 3 Sample Size
(*Clause* 13.3)

Sl No.	Lot Size (Reels, Cheeses, Etc)	Sample Size Number of Reels or Cheeses to be Selected
(1)	(2)	(3)
i)	Up to 150	3
ii)	151 to 300	5
iii)	301 to 500	7
iv)	501 to 1 000	10

13.4 The reels, cheeses, etc, selected according to **13.3** shall constitute the test sample for all the requirements except colour fastness. One test specimen shall be selected from each of the reels, cheeses, etc, selected for carrying out the test for each requirement.

13.5 The number of test specimens to be selected at random for testing colour fastness from the test sample shall be 3.

14 CRITERIA FOR CONFORMITY

14.1 The lot shall be considered to be in conformity with the requirements of this standard, if the following conditions are satisfied:

a) None of the test specimens is found defective when tested for the requirement mentioned in **6.2.**
b) None of the test specimens tested for colour fastness shall fail to satisfy the corresponding requirements.
c) From the results in respect of any of the requirements, namely, count, length per kilogram, breaking strength, wax finishing, rot-proofing, *p*H of aqueous extract and residual alkali, the average x and the range R or the mean range R are calculated and the applicable condition(s) from amongst those given below is/are satisfied:

1) The value of the expression $\bar{X} + k\bar{R}$ or $\bar{x} + kR$ is less than or equal to U where the upper specification limit U is given.

2) The value of the expression $X — \bar{x}\,R$ or $\bar{X} — k\bar{R}$ is greater than or equal to L where the lower specification limit L is given.

3) If both the upper and lower specification limits U and L are given, the conditions (1) and (2) as well as the following conditions are satisfied.

The value of the expression

$$\frac{U}{U-L} \text{ or } - \frac{\bar{R}}{U-L} < B$$

NOTES

1 The constant k and B shall be as given below:

No. of Test Result	*K*	*B*
(n)		
less than 10	06.	08.
10 or 15	07.	06.

2 Average $\bar{X}$ is the value obtained by dividing the turn of the observed values by the number of tests.

3 Range R is the difference between the maximum and the minimum in a set of observed values.

4 When the number of test results is 10 or 15, they shall be grouped in groups of 5. The mean range $\bar{R}$ is the value obtained by taking the average of the groups.

ANNEX A

(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
IS 296 : 2023	Sodium carbonate, anhydrous — Specification (*fourth revision*)
IS 1070 : 2023	Reagent grade water — Specification (*fourth revision*)
IS 1314 : 1984	Specification for calcium chloride (*second revision*)
IS 1390 : 2022	Textiles — Determination of ph of aqueous extract (*third revision*)
IS 1670 : 1991	Textiles — Yarn — Determination of breaking load and elongation at break of single strand (*second revision*)
IS 3522 (Part 1) : 1989	Methods for estimation of common preservatives on textiles – Part 1 (*first revision*)
IS 6359 : 2023	Method for conditioning of textiles (*first revision*)
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* 6.2.1)

PROCEDURE AND TEST METHOD FOR ROT-PROOFING BY PENTACHLOROPHENYL LAURATE

B-1 PERSERVATIVE AGENT — The preservative agent shall be pentachlorophenyl laurate.

B-2 APPLICATION — The process shall consist of an even and thorough impregnation of the textile with either:

a) a solvent solution of agent, or
b) an aqueous emulsion of the agent.

This shall be followed by removal of excess and subsequent drying or thorough solvent removal. The treated textile shall be dry in handling and non-tacky.

B-2.1 Amount of Preservative Agent — The amount of preservative agent shall be as follows.

B-2.1.1 The pentachlorophenyl laurate content of the treated textile shall be not less than 1.7 percent nor more than 3.5 percent.

B-2.2 In neither case shall the free PCP content of the treated textile exceed 10 percent of the pentachlorophenyl laurate content.

B-3 DETERMINATION OF PENTACHLOROPHENYL LAURATE (PCPL) CONTENT

B-3.1 General — The method is applicable to the determination of PCPL in the absence of added pentachlorophenol. The proofing is hydrolyzed, acidified and steam distilled and the pentachlorophenol in the distillate extracted with 1,1,1 trichloroethane and lcomplexed in 1,1,1-trichloroethane is measured on a suitable spectrophotometer at 450 nm.

B-3.2 Reagents

B-3.2.1 *Ethanediol (ethylene glycol)*
B-3.2.2 *1,1,1-trichloroethane*
B-3.2.3 *Pyridine (AR, GRP grade)*
B-3.2.4 *Sodium Hydroxide, Pellet*

B-3.2.5 *Copper Sulphate Reagent Solution 50 g/1*
B-3.2.6 *Pentachlorophenol (standard reagent, melting point 188°C minimum)*
B-3.2.7 *Hydrochloric Acid, Concentrated 36 Percent, (m/v) (11 M)*
B-3.2.8 *Copper Sulphate-pyridine Reagent Solution* — prepared by mixing 4 ml pyridine with 6 ml copper sulphate solution immediately before use.

B-3.3 Procedure — Weigh 2.5 g ± 0.05 g of the material, cut into small pieces of not more than 5 mm square and place in a dry 250 ml round bottomed flask (B24/29 socket). Add 30 ml of ethanediol, 4 g of sodium hydroxide (pellet form), 2.4 ml of water, in that order and a few anti bumping granules. Connect the flask with a double surface condenser, bring the contents to boiling point on a sandbath and boil them vigorously for 30 min under reflex. After this allow the contents of the flask to cool, remove the reflux condenser and add through a funnel 60 ml water followed by 20 ml hydrochloric acid. Steam distil the contents of the flask ensuring that a constant volume is maintained by applying gentle heat as necessary. Collect 300 ml of distillate in a suitable receiver, applying care to prevent loss of pentachlorophenol in the distillate by adequate cooling. Discontinue the external heating of the flask a few minutes before disconnecting the steam supply. Disconnect the condenser and fit it vertically over the distillate receiver. Wash down the condenser with 25 to 30 ml of trichloroethane and collect the washings in the distillate. Transfer the distillate and trichloroethane washing to a 500 ml separating funnel and shake thoroughly. Allow the layers of water and trichloroethane to separate completely before running off the trichloroethane layer into a 100 ml separating funnel. Wash the condenser and distillate receiver with a further 25-30 ml trichloroethane and add this to the aqueous solution into the 500 ml separating funnel. Repeat the extraction as given above and add the trichloroethane layer to the first trichlroethane extract in the 100 ml separating funnel. Add to the bulked trichloroethane extract 10 ml of copper sulphate-pyridinc reagent and shake well. After complete separation of the aqueous and trichloroethane layers, run the lower trichloroethane layer into a 100-ml volumetric flask via a small funnel containing anhydrous sodium sulphate supported by means of a quartz wool plug. Add small quantity of trichloroethane to the copper sulphate-pyridine solution remaining in the separating funnel, shake and allow the layers to separate. Filter the trichloroethane layer through quartz wool plug and collect in the volumetric flask. Wash the filter with further small quantities of trichloroethane and finally make up to 100 ml trichloroethane. Determine the optical density of the solution using a suitable spectrophotometer at 450 nm using trichloroethane as a blank. Estimate the PCPL content by reference to a calibration graph prepared from known standards of pentachlorophenol (10 percent pentachlorophenol 1.71 percent PCPL).

NOTE — If the proofing is expected to contain both pentachlorophenol and PCPL then the free pentachlorophenol content should be determined as given in IS 3522 (Part 1), and the amount found deducted from the apparent PCPL content.

B-3.4 Calibration

B-3.4.1 Direct — Prepare a calibration graph using 5, 10, 15 ml aliquots of a standard solution of pentachlorophenol reagent (1 g/200 ml) in trichloroethane to cover a range of 1, 2 and 3 percent, respectively. Dilute each aliquot to 50-60 ml with trichloroethane, and 10 ml of copper sulphate-pyridine reagent, shake well and then follow the described procedure. Plot optical density against concentration of PCPL.

B-3.4.2 Indirect — Prepare a calibration graph using 5, 10 and 15 ml aliquots of a standard solution of pentachlorophenol reagent (1 g/200 ml) in dilute sodium hydroxide solution (sufficient for complete solution of pentachlorophenol). Place each aliquot in a round bottomed flask, add 60 ml water and 20 ml hydrochloric acid. Fit the flask for steam distillation and then follow the described procedure. If the distillation technique is satisfactory then the graphs obtained as in **B-3.4.1** and **B-3.4.2** should be the same.

ANNEX C

(*Clause* 6.6.1)

DETERMINATION OF RESIDUAL ALKALI SOLUBILITY

C-1 TEST SPECIMENS

C-1.1 For the purpose of this test approximately 10 g of sewing thread, taken from each reel or cheese in the test sample (*see* **13.4**) shall constitute the test specimens.

C-2 APPARATUS

C-2.1 Buchner Funnel — about 15 cm dia.

C-2.2 Reflux Condenser

C-2.3 Flask, 500 ml Capacity, with Ground Glass Joint

C-2.4 Filter Paper Hardened

C-2.5 Stoppered Weighing Bottles, Three, Tared and Dry

C-3 REAGENTS

C-3.1 Quality of Reagents — Unless otherwise specified, pure chemicals shall be employed in tests and distilled water (*see* IS 1070) shall be used where the use of water or distilled water as a reagent is intended.

NOTE — 'Pure chemicls' shall mean chemicals that do not contain impurities which affect the experimental results.

C-3.2 Sodium Carbonate — anhydrous, conforming to IS 296.

C-4. PROCEDURE

C-4.1 Divide one test specimen into approximate three equal portions. Weigh them separately in dry stoppered weighing bottles. Take 250 ml of a five percent solution of anhydrous sodium carbonate in distilled water, in a 500 ml conical flask fitted with a reflux condenser and bring to boil. Add the first portion of the test specimen kept in one of the weighing bottles to the boiling solution and continue the boiling gently for two and a half hours. Pour out the liquid and filter it through a hardened filter paper on a Buchner funnel. Wash the test specimen four times by decantation with 200 ml of hot distilled water and filter the washings through the filter. Transfer

the test specimen to the filter. Wash three times with 200 ml of distilled water and dry in a water heated oven at 98°C for about an hour. Transfer the test specimen along with any fragment of fibre detachable from the filter paper to the weighing bottle and dry to constant weight in an oven at 105 to 110°C.

C-4.2 Treat the second portion of the test specimen in the same way as the first portion excepting that distilled water shall be used instead of sodium carbonate solution.

C-4.3 Dry the third portion to constant weight in an oven at 105 °C to 110 °C.

C-4.4 Calculate the percentage loss in weight produced by the carbonate, boil and distilled water boil on the basis of oven dry weight. The difference between these two expressed as percentage of oven dry weight is the percentage alkali solubility of the test specimen.

C-4.5 Determine similarly the alkali solubility of the remaining test specimens.

C-5 REPORT

C-5.1 Report the lot to be in conformity with the requirements of **6.6.1** if the test value satisfies the condition prescribed in **14.1** (c)(1).

ANNEX D

(*Clause* 7.1, Table 2)

METHOD FOR DETERMINATION OF LENGTH IN METRES PER KILOGRAM

D1 TEST SPECIMENS

D-1.1 For the purpose of this test, all reels, cheeses, etc, in the sample under test (*see* **13.4**) shall constitute the test specimens.

D-2 CONDITIONING OF TEST SPECIMENS

D-2.1 Prior to test, specimens shall be conditioned in a standard atmosphere of 65 percent ± 2 percent relative humidity and 27 °C ± 2 °C temperature (*see* IS 6359) for 24 h.

D-3 APPARATUS

D-3.1 Wrap Reel — equipped with a dial showing the number of revolutions and to wind precisely one metre per revolution.

D-3.2 Analytical Balance

D-4 PROCEDURE

D-4.1 Place one reel, cheese, etc, constituting the test specimen on the wrap reel and wind 100 ml of sewing thread. Apply sufficient tension on the thread during winding so as to keep it tight without stretching it. Remove the thread so wound from the wrap reel and determine its weight in grams.

D-4.2 Calculate the length in metres per kilogram by the following formula:

$$\text{Length, in m per kg} = \frac{100 \times 1\,000}{W}$$

where

W = weight in g of 100 m of sewing thread.

D-4.3 Repeat the test with the remaining reels, cheeses, etc, in the test specimen.

D-5 REPORT

D-5.1 Report the lot to be conformity with the relevant requirement of Table 1 if the test value satisfies the conditions prescribed in **14.1** (c) (l, 2 and 3).

ANNEX 4
(*Item* 4.2)

Comments received from M/s **MOTILAL DULICHAND PVT. LTD**, Kanpur on IS 2196

Subject: Review of Indian Standard IS: 2196-1985 for Linen (Flax) Sewing Thread for Aerospace Purpose

Dear Sir

We have thoroughly reviewed the specification and would like to propose some revisions based on our observations.

Twist Contraction and Finished Thread Length: Upon reviewing Table No. 2 and Column No. 4 of the specification, we noticed that the Length in meters per kilogram of Finished Thread is mentioned. However, it appears that the twist contraction percentage of the finished threads has not been taken into consideration while determining these values. We strongly believe that the final value of the finished thread should be approximately 5% to 7% coarser than the specified value to account for twist contraction. Therefore we kindly request you to thoroughly examine this aspect and consider revising the specification accordingly to ensure accurate measurements.

Minimum Breaking Strength: The specification sets a minimum breaking strength requirement of X kg on a 50cm test length of finished thread. However, we must highlight that achieving this minimum breaking strength with the current availability of Linen raw material in India is practically difficult. The RKM value of high-quality wet-spun combed yarn in India typically ranges around 25~28. As a result, meeting the specified minimum breaking strength becomes a challenging task.

To attain the required strength, manufacturers may have to produce the finished thread with approximately 20% more strength than the specified value. We urge you to consider the practical limitations of the available yarn quality in India and assess whether accepting a 20% reduction in strength from the specified minimum would be acceptable for end-users. It appears that the initial specification might have been based on Imported Flax/Linen Single Yarn, which may not be feasible for local producers considering the volume of demand.

In light of the above points, we kindly request you to thoroughly re-evaluate the existing specification and make the necessary adjustments.

Annex 5A
(Item 6.1)

REVIEW ANALYSIS OF INDIAN STANDARD

(To be submitted to the Sectional Committee)

1. **Sectional Committee No. & Title:** TXD 13 (Textile Materials for Aeronautical and Related Products Sectional Committee)

2. **IS No:** IS 11916 : 2001

3. **Title:** Textiles — Continuous filament glass yarn for aerospace and other purposes — Specification (first revision)

4. **Date of review:** 24 May 2024

5. **Review Analysis**

i) Status of standard(s), if any from which assistance had been drawn in the formulation of this IS.

Standard (No. & Title)	Whether the standard has since been revised	Major changes	Action proposed
NA	NA	NA	NA

ii) Status of standards referred in the IS

Referred standards (No. & Title)	IS No. of this standards since revised	Changes that are of affecting the standard under review	Action proposed
IS 832 : 1985 Method for determination of twist in yarn (first revision)	IS 832 (Part 1) : 2021 ISO 2061 : 2015 Textiles — Determination of twist in yarns Part 1 Direct counting method (third revision)	This standard is superseded to IS 832 (Part 1) : 2021	Latest version of the IS 832 (Part 1) : 2021 standard shall be referred in the revision and accordingly other changes will be

			made wherever required
IS 1390 : 1983 Methods for determination of pH value of aqueous extract of textile materials (first revision)	IS 1390 : 2022 ISO 3071 : 2020 Textiles — Determination of pH of aqueous extract (third revision)	This standard is superseded to IS 1390 : 2022	Latest version of the IS 1390 : 2022 standard shall be referred in the revision and accordingly other changes will be made wherever required
IS 2303 : 1963 Method of grading glass for alkalinity	IS 2303 (Part 1/Sec1) : 2021 ISO 719 : 2020 Grading Glass for Alkalinity Part 1 Hydrolytic Resistance of Glass Grains Section 1 Determination and classification of hydrolytic resistance at 98°C (third revision)	This standard is superseded to IS 2303 (Part 1/Sec1) : 2021	Latest version of the IS 2303 (Part 1/Sec1) : 2021 standard shall be referred in the revision and accordingly other changes will be made wherever required
IS 4420 : 1967 Methods for determination of conductivity of aqueous and organic extracts of textile materials	IS 4420 : 2022 Methods for determination of conductivity of aqueous and organic extracts of textile materials (first revision)	The first revision has been made to incorporate the following changes: a) Amendment 1 has been incorporated; and b) Apparatus as per the testing procedure has been updated.	Latest version of the IS 4420 : 2022 standard shall be referred in the revision and accordingly other changes will be made wherever required

iii) Any other standards available related to the subject & scope of the standard being reviewed (International/regional/other national/association/consortia, etc or of new or revision of existing Indian Standard)

Standard (No. & Title)	**Provisions that could be relevant while reviewing the IS**	**Action proposed**
NA	NA	NA

iv) Technical comments on the standard received, if any

Source	Clause of IS	Comment	Action proposed
NA	NA	NA	NA

v) Information available on technical developments that have taken place (on product/processes/practices/use or application/testing/input materials, etc)

Source	Development	Relevant clause of the IS under review that is likely to be impacted (Clause & IS No.)	Action proposed
INTERNAL (TXD)	Sampling clause needs to be updated.	6	New sampling clause shall be incorporated.
INTERNAL (TXD)	Packing clause to be modified as per current market practices.	8	Packing clause will be modified in the present revision.
INTERNAL (TXD)	Marking clause needs to be updated.	9	New clause for Marking shall be incorporated.

vi) Issues arising out of changes in any related IS or due to formulation of new Indian Standard

Related IS and its Title (revised or new)	Provision in the IS under review that would be impacted & the clause no. or addition of new clause/provision	Changes that may be necessary in the Standards under review	Action proposed
NA	NA	NA	NA

vii) Any consequential changes to be considered in other IS

Related IS to get impacted	Requirements to be impacted
NA	NA

1. Any other observation:

i. Foreword shall be modified while revising the Indian standard.

Recommendations:

Based on the above observations, the standard may be reaffirm for further periods of 5 years with revision, the committee shall decide.

Annex 5B
(Item 6.1)

REVIEW ANALYSIS OF INDIAN STANDARD

(To be submitted to the Sectional Committee)

1. **Sectional Committee No. & Title:** TXD 13 (Textile Materials for Aeronautical and Related Products Sectional Committee)

2. **IS No:** IS 2197 : 2000

3. **Title:** Aerospace textiles – Braided (Plaited) linen (flax) lacing cord – Specification (second revision)

4. **Date of review:** 22 May 2024

5. **Review Analysis**

i) Status of standard(s), if any from which assistance had been drawn in the formulation of this IS.

Standard (No. & Title)	Whether the standard has since been revised	Major changes	Action proposed
NA	NA	NA	NA

ii) Status of standards referred in the IS

Referred standards (No. & Title)	IS No. of this standards since revised	Changes that are of affecting the standard under review	Action proposed

IS 296 : 1986 Sodium carbonate, anhydrous (third revision)	IS 296 : 2023 Sodium Carbonate Anhydrous — Specification (fourth revision)	In this revision, instrumental test methods for the determination of aluminium, arsenic, calcium, chlorides, copper, iron, lead, sulphates and magnesium have been added as alternate test methods.	Latest version of the standard i.e. IS 296 : 2023 shall be referred in the revision and accordingly other changes will be made wherever required.
IS 765 : 1979 Method for determination of colour fastness of textile materials to washing : Test 4 (second revision)	IS/ISO 105-C10 : 2006 Textiles — Tests for colour fastness Part C10 Colour fastness to washing with soap or soap and soda	This standard is superseded to IS/ISO 105-C10 : 2006	Latest version of the IS/ISO 105-C10 : 2006 standard shall be referred in the revision and accordingly other changes will be made wherever required
IS 832 : 1985 Method for determination of twist in yarn (first revision)	IS 832 (Part 1) : 2021 ISO 2061 : 2015 Textiles — Determination of twist in yarns Part 1 Direct counting method (third revision)	This standard is superseded to IS 832 (Part 1) : 2021	Latest version of the IS 832 (Part 1) : 2021 standard shall be referred in the revision and accordingly other changes will be made wherever required
IS 1070 : 1992 Reagent grade water (third revision)	IS 1070 : 2023 Reagent Grade Water Specification (fourth revision)	In this fourth revision requirement for total organic has been added and other editorial changes have been incorporated.	Latest version of the IS 1070 : 2023 standard shall be referred in the revision and accordingly other changes will be made wherever required
IS 1315 : 1977 Method for determination of linear density of yarn spun on cotton system (first revision)	Same Version	NA	NA

IS 1671 : 1977 Method for determination of yarn strength parameters of yarn spun on cotton systems (first revision)	Same Version	NA	NA
IS 2454 : 1985 Method for determination of colour fastness of textile materials to artificial light (xenon lamp) (first revision)	IS/ISO 105-B02 : 2014 Textiles — Tests for colour fastness — Part B02 : Colour fastness to artificial light: Xenon arc fading lamp test	This standard is superseded by IS/ISO 105-B02 : 2014	Latest version of the IS/ISO 105-B02 : 2014 standard shall be referred in the revision and accordingly other changes will be made wherever required
IS 6359 : 1971 Method for conditioning of textiles	IS 6359 : 2023 Method for conditioning of textiles (first revision)	The present revision has been made to incorporate the following changes: a) The time interval for moisture equilibrium for testing in an accelerated conditioning system has been specified; b) Principle for the rapid/accelerated conditioning has been specified; and c) The requirements for the standard alternative atmosphere have been specified.	Latest version of the IS 6359 : 2023 standard shall be referred in the revision and accordingly other changes will be made wherever required
IS 11662 : 1986 Preservative treatment of textiles	IS 11662 : 2024 Preservative treatment of textiles — Code of practice (first revision)	The revision has been made to incorporate the following changes: a) Amendment No.1 has been incorporated in the standard; b) Grade and purity of chemicals used have been specified; and c) The relevant method for estimation of pentachlorophenyl	Latest version of the IS 11662 : 2024 standard shall be referred in the revision and accordingly other changes will be made wherever required

		laurate (PCPL) prescribed in IS 3522 (Part 2) has been specified.	

iii) Any other standards available related to the subject & scope of the standard being reviewed (International/regional/other national/association/consortia, etc or of new or revision of existing Indian Standard)

Standard (No. & Title)	**Provisions that could be relevant while reviewing the IS**	**Action proposed**
NA	NA	NA

iv) Technical comments on the standard received, if any

Source	**Clause of IS**	**Comment**	**Action proposed**
NA	NA	NA	NA

v) Information available on technical developments that have taken place (on product/processes/practices/use or application/testing/input materials, etc)

Source	**Development**	**Relevant clause of the IS under review that is likely to be impacted (Clause & IS No.)**	**Action proposed**
INTERNAL (TXD)	Marking clause needs to be updated.	11	New clause for marking shall be incorporated.
INTERNAL (TXD)	Packing clause to be modified as per current market practices.	12	Packing clause will be modified in the present revision.

INTERNAL (TXD)	Sampling clause needs to be updated.	13	New sampling clause shall be incorporated.

vi) Issues arising out of changes in any related IS or due to formulation of new Indian Standard

Related IS and its Title (revised or new)	**Provision in the IS under review that would be impacted & the clause no. or addition of new clause/provision**	**Changes that may be necessary in the Standards under review**	**Action proposed**
NA	NA	NA	NA

vii) Any consequential changes to be considered in other IS

Related IS to get impacted	**Requirements to be impacted**
NA	NA

Recommendations:

Based on the above observations, the standard may reaffirm for further period of 5 years with revision, the committee shall decide.

Annex 5C
(Item 6.1)

REVIEW ANALYSIS OF INDIAN STANDARD

(To be submitted to the Sectional Committee)

1. **Sectional Committee No. & Title:** TXD 13 (Textile Materials for Aeronautical and Related Products Sectional Committee)

2. **IS No:** IS 4727 : 2020

3. **Title:** Textiles — Nylon webbing for aeronautical purposes — Specification (first revision)

4. **Date of review:** 24 May 2024

5. **Review Analysis**

a) Status of standard(s), if any from which assistance had been drawn in the formulation of this IS.

Standard (No. & Title)	Whether the standard has since been revised	Major changes	Action proposed
NA	NA	NA	NA

b) Status of standards referred in the IS

Referred standards (No. & Title)	IS No. of this standards since revised	Changes that are of affecting the standard under review	Action proposed
IS 1390 : 2019 Textiles — Determination of pH of aqueous extract (second revision)	IS 1390 : 2022 ISO 3071 : 2020 Textiles — Determination of pH of aqueous extract (third revision)	This standard is superseded to IS 1390 : 2022	Latest version of the standard i.e. IS 1390 : 2022 shall be referred in the revision and accordingly other changes will be made wherever required.

IS 1398 : 1982 Specification for packing paper water proof, bitumen-laminated (second revision)	Same Version	NA	NA
IS 1963 : 1981 Methods for determination of threads per unit length in woven fabrics (second revision)	Same Version	NA	NA
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 (fourth revision)	Same Version	NA	NA
IS 2508 : 2016 Polyethylene films and sheets — Specification (third revision)	Same Version	NA	NA
IS 7702 : 2012 Textiles — Determination of thickness of textiles and textile products (first revision)	Same Version	NA	NA
IS/ISO 105-B01 : 2014 Textiles — Tests for colour fastness: Part B01: Colour fastness to light: Daylight	Same Version	NA	NA
IS/ISO 105-B02 : 2014	Same Version	NA	NA

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	Same Version	NA	NA

c) Any other standards available related to the subject & scope of the standard being reviewed (International/regional/other national/association/consortia, etc or of new or revision of existing Indian Standard)

Standard (No. & Title)	**Provisions that could be relevant while reviewing the IS**	**Action proposed**
NA	NA	NA

d) Technical comments on the standard received, if any

Source	**Clause of IS**	**Comment**	**Action proposed**
NA	NA	NA	NA

e) Information available on technical developments that have taken place (on product/processes/practices/use or application/testing/input materials, etc)

Source	**Development**	**Relevant clause of the IS under review that is likely to be impacted (Clause & IS No.)**	**Action proposed**

NA	NA	NA	NA

f) Issues arising out of changes in any related IS or due to formulation of new Indian Standard

Related IS and its Title (revised or new)	Provision in the IS under review that would be impacted & the clause no. or addition of new clause/provision	Changes that may be necessary in the Standards under review	Action proposed
NA	NA	NA	NA

g) Any consequential changes to be considered in other IS

Related IS to get impacted	Requirements to be impacted
NA	NA

Recommendations:

Based on the above observations, the standard may reaffirm for further period of 5 years, the committee shall decide.