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BUREAU OF INDIAN STANDARDS

(*New Delhi*)

AGENDA

Textile Materials for Aeronautical and Related Products Sectional Committee, TXD 13 **17th Meeting**

Date (Day)	Time	Venue
03 January 2024 (Wednesday)	1500 h	Through Video Conferencing

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

Member Secretary: Shri Ranga Banothu,Sc-B BIS, New Delhi

Item 0 WELCOME & INTRODUCTORY REMARKS OF CHAIRPERSON

Item 1 CONFIRMATION OF THE MINUTES OF THE PREVIOUS MEETING

1.1 The minutes of the 16th meeting of the Committee held on 14 July-2023 through Webex Video Conferencing were circulated vide BIS DG letter no TXD 13/A2.16 dated 14 August 2023 and no comments have been received.

1.1.1 The Committee may **APPROVE.**

Item 2 SCOPE AND COMPOSITION OF TXD 13

2.1 The present scope and composition of the Committee is given in **Annex 1 (P-3 & 4).**
2.1.1 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 16th meeting is given in **Annex 2** (P- 5).

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 previous meeting the following revision draft of the Indian standards have been circulated as given in **Annex 3 (a) (P - 6 to 13)** and **Annex 3 (b) (Page 14 to 26)** for the period of 60 days. No comments have been received.

a) TXD 13 (22121) TEXTILES — BRAIDED NYLON CORDS FOR AEROSPACE PURPOSES — SPECIFICATION (Third Revision of IS 4227)
b) TXD 13(22872) TEXTILES — NYLON SEWING THREADS FOR AEROSPACE PURPOSES — SPECIFICATION (Third Revision of IS 4229)

4.1.1 The committee may **DECIDE**.

Item 5 RESEARCH AND DEVELOPMENT PROJECT

5.1 As per the discussion in the previous meeting, the following subject has been identified for taking up R & D project under TXD 13.

i) Cotton Tapes for Aeronautical Applications

BIS guidelines for R & D project has been attached at **Annex 4 (P-27 to 46)** and Terms of Reference (ToR) for the above R & D Project drafted by BIS has been attached at **Annex 5 (P-47 to 50)**.

5.1.1 The Committee may **DECIDE**.

Item 6 REVIEW OF PUBLISHED STANDARDS

6.1 The pre 2000 standards on which the decision to be taken under the domain of TXD 13 is as following:

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)

BIS has prepared the proforma for the above standards as given in **Annex 6 (a) (P-51 to 56)** and **Annex 6 (b) (P-57 to 61).**

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
14th meeting	22 February 2022 through WebEx video conference
15th meeting	11 November 2022 through WebEx video conference
16th meeting	11 July 2023 (Hybrid) ADRDE, Agra

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	3/3
3.	Defence Materials and Stores Research and Development Establishment, Kanpu	Shri Biswa Ranjan Das Smt Priyanka Katiyar	1/3
4.	Directorate General of Aeronautical Quality Assurance, Ministry of Defense, New Delhi	Shri Daljeet Singh Dr. Subash	2/3
5.	Directorate General of Civil Aviation, New Delhi	Shri Hillol Biswas Shri Lalit Gupta	1/3
6.	Directorate General of Quality Assuranc Ministry of Defense, New Delhi	Shri Col. Vijay Maurya Shri Purushottam De	2/3
7.	Garware Technical Fibres Limited, Pune	Shri Kishor J Darda Shri Satish J Chitnis	3/3
8.	Kusumgar Corporates Private Limited, Vapi	Dr M. K. Talukdar Shri Siddharth Y Kusumgar	3/3
9.	Indian Space Research Organization - Vikram Sarabhai Space Centre, Thiruvananthapuram	Dr Santhosh B Shri Anil Painuly	3/3

Sl No.	Organization Represented	Name of The Representative Principal/ (Alternate)	Attendance
10.	Motilal Dulichand Private Limited, Kanpur	Shri Shailendra Misra Shri Sunil Prahladka	3/3
11.	Office of the Textile Commissioner, Mumbai	Shri Humayun K Shri Jamil Ahmed	2/3
12.	Ordnance Parachute Factory, Kanpur	Shri K K Toppo Shri Sachin Khoria	3/3
13.	Oriental Synthetic & Rayon Mills Pvt Ltd, Na Mumbai	Smt Smita Yeole Shri Saurabh Phadtare	1/3
14.	RCMA, Kanpur	Shri P K Shukla Shri Alok Kumar	2/3
15.	SRF Private Limited, Chennai	Ms Angelina Divya Shri Ankur Sharma	2/3
16.	Thanawala and Company, Mumbai	Shri Hemal M Thanawala Shri Vivaan Thanawala	3/3
17.	The Synthetic and Art Silk Mills Research Associatic Mumbai	Dr. Manisha Mathur Smt. Ashwini Sudam	2/3
18.	Todi & Company Ltd, Mumbai	Shri S P Todi Shri Adarsh Todi	2/3
19.	Universal Yarns & Tex Private Limited, Kanpur	Shri Rajiv K Bhartiya	2/3
20.	Uttar Pradesh Textile Technology Institute, Kanpur	Prof. Mukesh Kumar Singh	3/3
21.	Urja Products Private Limited, Ahmedabad	Shri Anshul Nanavaty	3/3
22.	Vardhaman Yarn and Threads Limited, Gurgaon	Shri Anu Handa	3/3
23.	Viraj Syntex Pvt Ltd, Kanpur	Shri Amit Singh Shri Jai Singh	0/3

ANNEX 2
(*Item 3.1*)

SUMMARY OF ACTIONS TAKEN ON THE MINUTES OF THE LAST MEETING

Item No.	Decision	Action taken
3.1	Changes in scope and composition of TXD 13	Updated scope and composition are given in Annex 1.
5	**FORMULATION OF INDIAN STANDARDS ON NEW SUBJECTS** Nylon Tapes for Aircraft Arrester Barrier	 WC is under preparation.
6	**DRAFT STANDARDS FOR FINALIZATION**	
	a) TXD 13 (21136) Textiles — Braided Cotton Cord for Aerospace Purposes — Specification (Second Revision of IS 1402).	F- draft has been prepared and document is under publication.
	b) TXD 13 (21155) Scoured or Dyed Cotton Tapes for Aerospace Purposes — Specification (Second Revision of IS 3255).	
7	**COMMENTS ON PUBLISHED INDIAN STANDARDS** a) IS 514 : 1992 Textiles — Mercerized cotton fabrics for covering aircrafts and gliders — Specification (*third revision*)	 Reallocated IS 1376 to M/s ADRDE, Agra.
	b) IS 1376 : 1998 Textiles — Cotton sewing threads for aerospace purposes — Specification (*third revision*)	Reallocated IS 1376 to M/s ADRDE, Agra.
	c) IS 3449 : 1984 Specification for cotton webbing for parachutes (*second revision*)	Document has been Wide Circulated.
	d) IS 3846 : 1984 Specification for rot-proofed cotton tapes for aerospace purposes (*first revision*)	Coming up for discussion at Item 6.
	e) IS 6349 : 1981 Specification for tape, nylon, tubular for aerospace applications (*first revision*)	WC is under preparation.
	f) IS 4726 : 1984 Specification for light weight nylon fabric for parachutes	WC is under preparation.
8	**REVIEW OF PUBLISHED STANDARDS**	Coming up for discussion at Item 6.

ANNEX 3(a)
(*Items* 4.1)

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDRADS

Draft for comments only Doc No.: TXD 13(22872)
August 2023

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भारतीय मानक मसौदा

वस्त्रादि — वायु आकाशीय प्रयोजनों के लिए नायलॉन सिलाई धागे — विशिष्टि

(IS 4229 का *तीसरा पुनरीक्षण*)

Draft *Indian Standard*

TEXTILES — NYLON SEWING THREADS FOR AEROSPACE PURPOSES — SPECIFICATION

(*Third Revision* of IS 4229)

ICS : 49.025.60

Textile Materials for Aeronautical and Related Products Sectional Committee, TXD 13	Last date for receipt of comments is 30 October 2023

FOREWORD

(*Formal clauses will be added later*)

This Indian standard was first published in 1967 and subsequently revised in 1978 and 1992. The third revision has been made in the light of experience gained since its last revision and to incorporate the following major changes:

a) Linear density of nylon sewing threads of all varieties has been modified;
b) Packing and marking clauses have been updated; and
c) References to Indian standards have been updated.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1 SCOPE

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

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 YARN

Bright, high tenacity nylon 6 or nylon 6.6, shall be identified by confirmatory test of microscopic and dissolution as prescribed in IS 667 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; and
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.

Table 1 Physical Requirements

(*Clauses* 5.1 and 5.2)

Sl No.	**Variety No.**	**Structure of Sewing Thread**		**Length per Unit Mass,** m/kg, *Min* (*see* Note 1)	**Average Breaking Strength,** N, *Min* (*see* Note 1 and 2)	**Average Extension at Break,** Percent, *Max* (*see* Note 1)
		Filament Yarn Linear Density, Tex	**No. of Plies**			
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i)	L1	23.3	2	18 500	23.5	28
ii)	L2	23.3	3	12 300	35.0	28
iii)	H1	23.3	6 (2 × 3)	6 150	71.0	28
iv)	H2	23.3	9 (3 × 3)	4 100	106.0	28
v)	H3	23.3	12 (4 × 3)	3 075	141.0	28
vi)	H4	23.3	18 (6 × 3)	2 050	211.0	28

Method of Test, Ref to	IS 7071	—	IS 4910 (Part 2)	IS 4910 (Part 3)

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 In case of dyed and bond threads , additional 10 percent relaxation shall be provided in length per unit mass and filament linear density of yarn
3 No individual reading of breaking strength shall be less than the 95 percent of the specified value.

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

Sl. No.	Characteristic	Requirement	Method of Test, Ref to
(1)	(2)	(3)	(4)
i)	Colour fastness to:		
	a) Light	5 or better	IS/ISO 105-B01
	b) Washing, Test B (2)	4 or better	IS/ISO 105-C10
	c) Dry-cleaning	4 or better	IS/ISO 105-D01
ii)	Conductivity of aqueous extract (*see* Notes 1 and 2), S/cm *Max*	150	IS 4420
iii)	*p*H value of aqueous extract	6 to 8	IS 1390
iv)	Water soluble chlorides, as NaCl, *Max,* percent	0.1	IS 4202
v)	Water soluble sulphates, as Na_2SO_4, *Max,* percent	0.25	IS 4203

NOTES

1 Test for *p*H 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

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 ± 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(Part 1).

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 ± 5) s, 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), 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 stitches 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.

7 PACKAGING

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:

a) Manufacturer's name, initials, or trade-mark;
b) Name of the material;
c) Variety No. (*see* Table 1);
d) Finish of Yarn;
e) Nominal length or mass of thread in metres in a unit package;
f) Year of manufacture; and
g) Indication of the source of manufacture.

8.1.1 *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.

9 PACKING

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

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 dispatch 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 shall be followed.

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

Sl No.	**Lot Size**	**Sample Size**	**Permissible Number of Non-Conforming Packages**
(1)	(2)	(3)	(4)
i)	Upto 100	5	0
ii)	101 to 300	10	0
iii)	301 to 500	15	0
iv)	501 to 1 000	20	1
v)	1 001 and above	30	1

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

Sl No.	*Characteristics*	*Samples Size*	*Criteria for Conformity*
(1)	(2)	(3)	(4)
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 4 of Table 3.
b)	Colour Fastness, Conductivity of Aqueous Extract, *p*H 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)
LIST OF REFERRED STANDARDS

IS No.	*Title*
IS 667 : 1981	Methods for Identification of textile fibres (*first revision*)
IS 832 (Part 1) : 2021	Textiles — Determination of twist in yarns Part 1 Direct counting method (*third revision*)
IS 1066 : 1980	Code for packaging of sewing threads (*first revision*)
IS 1390 : 2022	Textiles — Determination of *p*H of aqueous extract (*third revision*)
IS 4202 : 2022	Method for determination of chloride content of textile materials (*first revision*)
IS 4203 : 2022	Method for determination of sulphate content in textile materials (*first revision*)
IS 4420 : 2022	Methods for determination of conductivity of aqueous and organic extracts of textile materials (*first revision*)
IS 4727 : 2020	Textiles — Nylon webbing for aeronautical purposes — Specification (*first revision*)
IS 4905 : 2015	Random sampling and randomization procedures (*first revision*)
IS 4910	Tyre yarns cords and tyre cord fabrics made from man-made fibres methods of test — Methods of test
(Part 2) : 2023	Part 2 Linear density (*second revision*)
(Part 3) : 2023	Part 3 Load and elongation properties (*second revision*)
(Part 5) : 2023	Part 5 Heat shrinkage and heat shrinkage force (*second 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
IS/ISO 105-D01 : 2010	Textiles — Tests for colour fastness Part D01 Colour fastness to drycleaning using perchloroethylene solvent

ANNEX B
(*Clause* 5.5.1)

TEST FOR SEWING PROPERTIES FOR THREADS OF LINEAR DENSITY ABOVE 9000 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.

B-2 TEST SPECIMEN

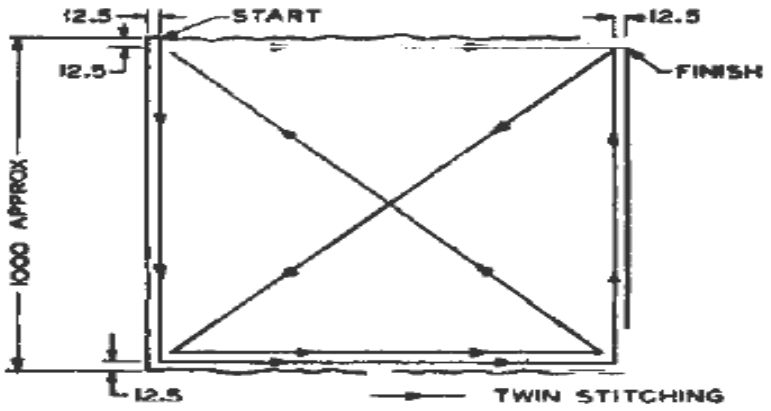
The test specimen shall consist of four full-width lengths, each approximately 1 m long, of nylon parachute fabric laid out in stack.

B-3 APPARATUS

A twin-needled lockstitch sewing machine capable of stitching at the rate of 3 250 ± 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-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.



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 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 No. H1 and H2 — 2 layers

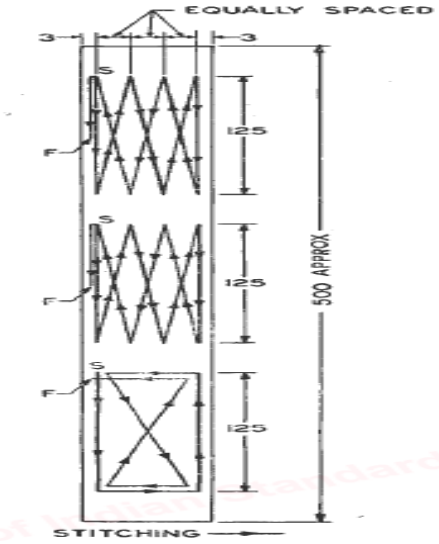
b) For threads of varieties No. H3 and H4 — 3 layers

C-2 APPARATUS

A single-needle lockstitch sewing machine, capable of stitching at the rate of 250 ± 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.



All dimensions in millimetres.

FIG. 2 TEST PIECE FOR HEAVY SEWING THREADS

ANNEX 3(b)
(*Item* 4.1)

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDRADS

For comments purpose only

Doc No.: TXD 13 (22121)
May 2023

भारतीय मानक मसौदा

वस्त्रादि — वायु आकाशीय प्रयोजनों के लिए गुम्फित हुई नायलॉन की रस्सियां — विशिष्टि

(IS 4227 का *तीसरा पुनरीक्षण*)

Draft *Indian Standard*

TEXTILES — BRAIDED NYLON CORDS FOR AEROSPACE PURPOSES — SPECIFICATION

(*Third Revision* of IS 4227)

Textile Materials for Aeronautical and Related Products Sectional Committee, TXD 13	Last date for receipt of comments is 14 July 2023

FOREWORD

(Formal clauses will be added later)

Nylon is most common rope fibre and significantly stronger than other man-made fibres. It is also great for shock absorption and dynamic load applications, which makes it useful for aeronautical purposes. For the usage in parachute applications braided form nylon rope is strongest option as it is tightly woven lock-stitch construction will not unravel, and provides a firm, steady rope.

This standard was first published in 1967 and subsequently revised in 1981 and 1998. This standard has been revised again to incorporate the following major changes:

a) The requirement for turns per metre (tpm) for braided nylon cords has been modified;
b) The tolerance for breaking loads on braided nylon cords has been modified;
c) Packing and marking clauses have been updated; and
d) Reference 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

1.1 This standard prescribes the constructional details and other requirements of different varieties of scoured and/or dyed nylon cords intended for use in parachutes and in the allied aerial delivery equipment and systems.

1.2 This standard does not specify the type of shade, finish, feel, etc, of the cords (*see also* **4.5**).

2 REFERENCES

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

3 MANUFACTURE

3.1 Yarn

3.1.1 The material of the yarn, that is continuous multifilament, bright, high tenacity nylon 6 or nylon 66, shall be identified by microscopic and dissolution test as prescribed in IS 667. The linear density of yarns in the core and sheath together with their construction is given in Table 1. The plied yarn shall be twisted as per **3.1.2**.

NOTE — In order to ascertain whether nylon type 66 or 6 yarn is used, the method of test for the determination of melting point in accordance with IS 5762 may be followed. The melting point of nylon 66 and nylon 6 shall not be less than 247 °C and 215 °C respectively.

3.1.2 The single yarns shall be suitably doubled and twisted together so that the product complies with the requirements of this standard. The turns per metre (tpm) in the individual yarns except for the varieties no. 11 and 12 shall be as follows:

Sl No.	*Nominal Count, dtex*	*tpm (Final)*	*Tolerance, percent*
(1)	(2)	(3)	(4)
i)	70 × 6	280	± 15
ii)	235 × 1	100, *Min*	—
iii)	235 × 2	320	± 15
iv)	235 × 3	240	± 15
v)	235 × 4	220	± 15
vi)	235 × 3 × 3	340	± 15
vii)	235 × 5 ×3	280	± 15
viii)	235 × 6 ×3	200	± 15
ix)	940 × 2	160	± 15
x)	940 × 3	160	± 15

xi)	1400	100, *Min*	—
xii)	1175	520	± 15

3.1.2.1 The turns per metre (tpm) for varieties no. 11 and 12 shall be as follows:

Sl No.	*Yarn*	*Single Twist*	*Ply Twist (Initial)*	*Ply Twist (Final)*
(1)	(2)	(3)	(4)	(5)
i)	Sheath	330	—	240
ii)	Core	40	520	280
Tolerance, percent		± 15	± 15	± 15
NOTE — Any twist less than 40 tpm is acceptable in intermingled yarn				

3.2 Cord

3.2.1 The cord shall be tightly formed in braided construction having uniform tension throughout its length. The core and sheath shall be well formed and free from knots, slubs or stains. The finished cord shall be of uniform round cross-section, clean, smooth to handle and free from all manufacturing defects.

3.2.2 The cords meant for use in personnel parachutes shall be identified by the inclusion of one black coloured thread in the braiding. The black colour of the thread shall be obtained by dyeing with acid type dyes.

4 REQUIREMENTS

4.1 Construction

The cords shall conform to the requirements as specified in Table 1.

Table 1 Requirements of Braided Nylon Cords/Cordages
(*Clauses* 3.1.1, 4.1 and 10.1.1)

Variety No.	**Nominal Linear Density of Yarn, dtex** (*see* Note 1)		**No. of Spindles**	**No. of Ends**		**Plaits /dm**	**Mass,** g/l00 m, *Max*	**Breaking Load on 15 cm Test Length,** N, *Min* (*see* Note 2)	**Elongation at Break,** Percent, *Min,* (*see* Note 2)
	Core	**Sheath**		**Sheath**	**Core**				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	—	235×1 to 235×2	16	16	—	90 ± 10	76	226	25
2	—	330 × 3 or 165 × 2 × 3	8	8	—	51 ± 1	91	295	25
3	—	235 × 1	16	32	—	90 ± 10	91	345	20
4	—	Alternate ends of 235× l and 235 × 2	32	32	—	105 ± 5	137	500	20
5	235 × 3 × 3	235	16	32	2	70 ± 10	140	452	25
6	—	Alternate ends of 235 × 3 and 235 × 4	16	16	—	80 ± 10	170	630	25
7	235 × 3 × 3	235 × 2	16	32	2	62 ± 8	270	890	25
8	—	1400	16	16	—	65 ± 5	315	1 000	20
9	—	940 × 2	16	16	—	40 ± 1	360	1 375	23
10	940×3	12 ends of 940 × 2 4 ends of 940 × 3	16	16	3	47 ± 4	555	1 785	25
10A	235 × 3 × 3	235 × 3 × 3	16	16	4				

11	235 × 5 × 3 or 1175 × 3	235 × 1 × 3	32	32	7	105 ± 5	570	1 785	30
12	235 × 5 × 3 or 1175 × 3	235 × 1 × 3	32	32	9	105 ± 5	665	2 452	30
13	235 × 6 × 3	235 × 3 × 3	16	32	4	43 ± 4	1 110	3 120	25
14	940 × 3 or 235 × 6 × 2	32 ends of 940 × 3 and 16 ends of 940 × 2 or 235 × 3 × 3	16	48	4 to 6	27 ± 4	1 665	5 335	25
15	—	940 × 9 for golden 940 × 12 for white (each spindle contains 2 golden and 3 white threads)	8	40	—	10	5 000	12 740	25
Method of Test, Ref to	IS 7071		—	**D-3**		**D-4**	IS 1964	IS 7071	

NOTES

1 The tolerance of $\frac{-5 \text{ percent}}{+12 \text{ percent}}$ for nominal linear density of varieties 11 and 12, and $\frac{-5 \text{ percent}}{+10 \text{ percent}}$ for other varieties shall be applicable.

2 In case of dyed cords, 5 percent relaxation shall be allowed in breaking load and elongation at break.

4.2 Slackness of Sheath and Core Looping Tendency

The cords shall be free from slackness of sheath and core looping tendency when tested by the method prescribed in Annex B.

4.3 Length

The length of cord in a ball, hank or bobbin shall be as agreed to between the buyer and the seller. The length shall be determined in accordance with IS 7071.

4.4 The cords shall also conform to the chemical requirements as specified in Table 2.

Table 2 Chemical Requirements of Braided Nylon Cords/Cordages
(*Clause* 4.4)

Sl. No.	Characteristics	Requirements	Methods of Test, Ref to
(1)	(2)	(3)	(4)
i)	*p*H value of aqueous extract	5.5 to 8	IS 1390
ii)	Colour fastness to (in case of dyed cords): a) Light (*see* Note 2)	5 or better	IS/ISO 105-B01 or IS/ISO 105-B02
	b) Washing: Test C (3)	4 or better	IS/ISO 105-C10

NOTES

1 Metallized/chrome dyes shall not be used in the production of dyed cords
2 In case of dispute IS/ISO 105-B01 shall be followed for determination of colour fastness to light.

4.5 Sealed Sample

4.5.1 In order to illustrate the pattern, workmanship, etc, of the cord, if a sample has been agreed upon and sealed, the supply shall also be in conformity with the sample in such respect.

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

5 INSPECTION

5.1 Freedom from Defects

Yarn contained in each unit of ball/hank/bobbin shall be visually examined, metre by metre, for the defects specified in Annex C. No ball/hank/bobbin shall contain more than five major

defects per 100 m. The unit of the product for examination shall be one linear metre. For each unit of product, the defects shall be counted as follows:

a) One major defect along with one or more minor defects shall be counted as one major defect;
b) Three or more minor defects shall be counted as one major defect;
c) One or more major defects shall be counted as one major defect; and
d) A continuous major defect shall be counted as one major defect for each unit of product or fraction thereof in which it occurs.

5.2 Each major defect shall be flagged by a red string sewn in the cord. Three minor defects occurring per linear metre shall be flagged by a red string sewn in the selvedge. One metre allowance shall be made for each major defect flagged except for continuous defect which shall be given a two metre allowance for each metre in which defect occurs.

5.3 Each ball/hank/bobbin of supply shall be continuous, without joints, of length not less than what has been specified or agreed upon between the buyer and the seller.

5.4 Overall Examination

Each ball/hank/bobbin shall be visually examined for overall defects as follows:

a) Spottiness, poor penetration of dye or off shade;
b) Uneven braiding throughout; and
c) Unevenness and streakiness of dyeing in excess of that shown by sealed sample (*see* **4.5**) for appearance.

6 PACKAGING

6.1 The cord of varieties 8 to 13 shall be wound in the form of continuous length, knot-free balls or hanks. The other varieties shall be supplied in knot-free continuous length on flanged bobbins. The length of cord to be contained in a ball or hank or bobbins shall be as agreed to between the buyer and the seller.

6.1.1 Each ball or hank shall be packed in a polyethylene bag which shall be heat sealed. The bags shall be wrapped in polyethylene film to form a pack.

6.1.2 Each bobbin shall be wrapped with tissue paper and five such bobbins shall be packed in a polyethylene bag which shall be heat sealed to form a pack.

7 MARKING

7.1 Each pack shall be tied with a suitable label on which the following information shall be marked:

a) Manufacturer’s name, initials, or trade-mark;
b) Name of the material;
c) Variety No.;
d) Length;
e) Indication of the source of manufacture;

f) Month and year of manufacture; and
g) Any other information required by the buyer.

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 An appropriate number of packages shall be placed in a corrugated cardboard carton or in a wooden packing case conforming either to style 2 (b) or 3 (b) of IS 1503 previously covered with one layer of low density polyethylene film of at least 100 µm thickness and conforming to IS 2508 first and then wrapped with one layer of waterproof packing paper conforming to Type I of IS 1398. The voids in the carton or case if any, shall be stuffed with paper cuttings to prevent movement of the contents of the carton or case. The lid shall be nailed to the case and the case bound at two places by baling hoopsropes or wire rope of adequate strength and in the case of cardboard carton the sample shall be bound by suitable strappings.

8.2 The gross mass of the case or carton shall not exceed 100 kg.

9 SAMPLING

9.1 Lot

All the, balls, hanks or bobbins of the cords manufactured from the same type of yarn and of same form of construction and finish delivered to a buyer against one despatch note shall constitute the lot.

9.2 Each ball, hank or bobbin of the lot shall be tested for breaking load and elongation at break and also inspected for defects.

9.3 The number of balls, hanks or bobbins to be selected at random from each lot for requirements other than breaking load and elongation shall be in accordance with Table 3.

9.3.1 The balls/hanks/bobbins selected according to **9.3** shall constitute the test sample for test.

Table 3 Sampling Plan
(*Clause* 9.3)

Sl No.	Lot Size (Number of Balls/ Hanks/Bobbins)	Sample Size
(1)	(2)	(3)
i)	Up to 25	3
ii)	26 to 50	8
iii)	51 to 90	13
iv)	91 to 150	20

v)	151 to 280	32
vi)	281 to 500	50
vii)	501 to 1 200	80
viii)	1 201 to 3 200	125

9.3.2 One specimen of 5 metres in length shall be drawn from each sample obtained as per **9.3** and **9.3.1** for carrying out the following tests:

a) Mass;
b) Plaits/dm;
c) Number of spindles and threads (in core and sheath, separately); and
d) Slackness of sheath and core looping tendency.

10 CRITERIA FOR CONFORMITY

10.1 The lot shall be declared conforming to the requirements of this standard, if the conditions given in **10.1.1** and **10.1.2** are satisfied.

10.1.1 The average of the observed values of breaking load shall be within the limit specified. No individual reading shall be less than 95 percent of the minimum value specified under co1 9 of Table 1.

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

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 1390 : 2022	Textiles — Determination of *p*H of aqueous extract (*third revision*)
IS 1398 : 1982	Specification for packing paper water proof, bitumen-laminated (*second revision*)
IS 1503 : 1988	Specification for wooden packing cases (*third revision*)
IS 1964 : 2001	Textiles — Methods for determination of mass per unit length and mass per unit area of fabrics (*second revision*)
IS 2508 : 2016	Polyethylene films and sheets — Specification (*third revision*)
IS 5762 : 1970	Methods for determination of melting point and melting range
IS 7071 : 2021	Fibre ropes — Determination of certain physical and mechanical properties (*second revision*)
IS/ISO 105 B01 : 2014	Textiles — Tests for colour fastness B01 Colour fastness to light : Daylight
IS/ISO 105 B02 : 2014	Textiles — Tests for colour fastness B02 Colour fastness to artificial light: Xenon arc fading lamp test
IS/ISO 105 C10: 2006	Textiles — Tests for colour fastness C10 Colour fastness to washing with soap or soap and soda

ANNEX B
(*Clause* 4.2)

METHOD FOR DETERMINATION OF SHEATH SLACKNESS AND CORE LOOPING TENDENCY

B-l TEST SPECIMENS

For the purpose of this test, a piece of cord approximately 2 m in length, cut from each ball or hank in the test sample shall constitute the test specimens.

B-2 PROCEDURE

B-2.1 Take one test specimen and knot it firmly at both the ends. Make a mark on the test specimen at a distance of 2.5 cm from one of the knots.

B-2.2 Starting from the other knot on the test specimen, pass it between the thumb and finger of one hand by using firm pressure so as to slide the sheath towards the marked end.

B-2.3 Observe the position of the mark and note the displacement of the mark, if any.

B-2.4 Now fold the test specimen, making it into loops of about 8 cm length, so that it may be conveniently held in one hand.

B-2.5 Hold the looped test specimen in one hand and impart rotatory rubbing motion to it by the other hand applying medium pressure. Continue the rubbing at the rate of one rub per second until a total of 60 rubs are imparted.

B-2.6 Alter 60 rubs, observe the test specimen for any penetration on the sheath by the core threads.

B-2.7 If there is no penetration of the sheath by the core threads, but bulges or nodules are observed on the test specimen, take two further test specimens and treat them in the same manner as prescribed in **B-2.4**.

B-2.8 Observe the two test specimens for any sign of core thread having penetrated the sheath.

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

ANNEX C
(*Clause* 5.1)
CLASSIFICATION OF DEFECTS

Sl No.	Type of Defects	Description	Major	Minor
a)	Abrasion marks	Resulting in rupture of individual yarns or plies, distortion in the orientation of threads, areas noticeably thinner than adjoining unaffected areas, or in nap sufficient to obscure the identity of the filaments in any yarn.	X	
b)	Broken or missing ends	Any broken end projecting from surface of the cord, missing ends.	X	
c)	Coarse or heavy ends (per 20 linear meters)	More than 2 ends Up to 2 ends	X	 X
d)	Light or fine ends (per 20 linear meters)	More than 2 ends Up to 2 ends	X	 X
e)	Core end protruded	Any	X	
f)	Heavy, thick, or hard places, or uneven plaits	Over 10 percent increase over maximum in plaiting or over 5 cm of increased plaits 10 percent increase over maximum in plaiting for 5 cm	X X	
g)	Holes	Any	X	
h)	Kinks, loose, popped out core	Any	X	
j)	Kinks, loops, snarls, slack or loose ends (per 10 linear metres)	More than 1	X	
k)	Knots in plied yarn (per 10 linear metres)	More than 1 knot in sheath yarns Any knot in core, 1 knot in sheath yarns	X X	 X
m)	Lapping of core ends	More than 25 cm in length 25 cm or less in length	X	 X
n)	Missing core ends	Any	X	
p)	Tight ends (per 10 linear metres)	More than 1 end 2 m long 1 end 2 m long	X	 X
q)	Identification yarn (when applicable)	Omitted	X	

ANNEX D
(*Table* 1)

METHODS OF TEST

D-l TEST SPECIMENS

D-l.1 For the purpose of this test, a length of cord measuring approximately 100 cm cut from each ball or hank in the test sample shall constitute the test specimens

D-2 CONDITIONING OF TEST SPECIMENS

D-2.1 Prior to test, the test specimens shall be conditioned in a standard atmosphere at (60 ± 5) percent RH and (27 ± 2) °C temperature (*see* IS 196) for at least 24 hours.

D-3 STRANDS IN BRAID

D-3.1 Take one test specimen. From one of its ends remove the interlacings and count the number of strands forming the braid. Take one strand and count the number of threads in it. Determine similarly the number of component threads in the remaining strands of the test specimen.

D-4 PLAITS

D-4.1 Take a test specimen and apply a tension equal to 1 percent of minimum breaking load of the cord (*see* Note). After (60 ± 5) s, mark in the length in tension of five separate one decimetre specimens.

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

D-4.2 Release the load and count the number of plaits in each decimetre specimen and calculate the average plaits per decimetre.

D-4.3 Repeat the test with the remaining test specimens.

ANNEX 4
((*Item* 5.1)
GUIDELINES FOR RESEARCH & DEVELOPMENT PROJECTS FOR FORMULATION AND REVIEW OF STANDARDS

1 INTRODUCTION

Bureau of Indian Standards (BIS), as the National Standards Body of India is responsible for formulating Indian Standards for products, processes and services. In the pursuit of this endeavour, it has so far developed more than 22000 Indian Standards. Action Research and Research & Development Projects have always been part of the standardization process. However, there has been a growing realisation in the context of the increasing diversification, innovation and complexities in the manufacturing sector and evolution of services and also due to the fast pace of changes in the manufacturing and services landscapes, research & development projects have to be made an integral part of the standardization process. The idea is that in principle no standard should be developed without intensive and insightful research work, which is not confined only to the review of the existing literature and focus group discussions on the subject chosen for standardization, but also covers the detailed field level study of the existing processes and practices in product manufacturing and service delivery. This requires a large network of domain area experts to carry out the research & development work. The existing network encompasses only a small segment of experts, who are either associated with technical committees as members or belong to some R&D organizations. The Memorandum of Understanding with the premier educational institutions imparting technical and professional education opens the window to the opportunities to expand this network substantially by utilizing the intellectual capital that resides with the faculty and the research scholars in these institutions. This association is conceived not only as a way to promote research & development work necessary for standards formulation but also to enrich the research ecosystem in these educational institutions.

2 OBJECTIVES

Objectives of this Scheme are to:

2.1 support and commission research & development projects to generate knowledge, empirical data and insights that would help in formulating new standards and updating & upgrading the existing Indian standards;

2.2 expand the network of domain area experts to carryout research & development projects in the areas related to standardization and conformity assessment; and

2.3 enrich the research ecosystem in the educational institutions imparting technical and professional education.

3 RESEARCH & DEVELOPMENT PROJECTS

3.1 Research & development projects under these guidelines are described as follows:

A project aimed at comprehensive, in depth and incisive study of a product, process or service or all taken together in respect of a subject under standardization, encompassing literature

review, analysis of the data from secondary sources, collection and analysis of data from primary sources and stakeholder consultations.

3.2 The duration of a project shall not exceed six months counted from the date of the award of the project to acceptance of the final report by the Sectional Committee concerned, provided that the Sectional Committee must not take more than one month to give its decision on the final report. Further provided that the time taken by the Sectional Committee for giving its decision shall not be counted. The Sectional Committee may extend the duration but for not more than 2 months in special circumstances, the reasons for which shall be recorded in the minutes of meeting of the Sectional Committee.

3.3 The upper limit for expenditure for a project shall be Rs 10 lakhs (including taxes) only.

3.4 BIS will publish a list of research & development projects along with Terms of Reference (ToR) on Standardization portal or any other suitable digital platform.

3.5 If any organization or an expert on behalf of an institute wants to propose a research & development project on any new and emerging area in which they have expertise, they can do so through the same platform for the consideration of the Sectional Committee.

4 TERMS OF REFERENCE (ToR)

4.1 The ToR of Research& development project shall be prepared by the Sectional Committee concerned, and shall contain:

a) Title, background and objectives of the study;
b) Expected research methodology (brief information, for example, survey, testing, industry visits, etc.);
c) Scope of study;
d) Outline of the tasks and final deliverables expected from the Proposers;
e) Methods of review, schedule for submitting the 1st draft report and project completion report;
f) Any support or inputs to be provided to the Proposer; and
g) Maximum duration of project and timelines for submission of proposal

4.2 While preparing the Terms of Reference (ToR) the sectional committee may consider the following points as a research & development project may include one or mix of the following:

a) Secondary research based on internet or published information including authentic data sources;
b) Survey based research (including industry visits) to ascertain prevailing market conditions and practices, standards in use, industry and consumer preferences, availability of infrastructure, technical capabilities, comparative trends, economic trends;
c) Ascertaining compliance to existing and proposed standards through testing, review of past test reports, other validation and verification checks; and
d) Basic and innovative research to establish normative criteria. Criteria may include performance, health, safety, environmental impact.

5 APPROVAL OF COMISSIONING OF THE RESEARCH AND DEVELOPMENT PROJECTS

5.1 There shall be a Review Committee for approving the projects recommended by the Sectional Committee. The composition of Review Committee shall be as follows:

DDG (SCMD)	: Chairperson
DDG (Standardization) concerned	: Member
DDG (Certification)	: Member
DDG (Labs)	: Member
Officer in-charge for research works in SCMD	: Member Secretary

5.2 The Head of Technical Department concerned and Member Secretary of the Sectional Committee shall apprise the review committee about the project and explain the rationale behind the proposed research & development project.

6 ELIGIBILITY CRITERIA

6.1 The following shall be eligible for carrying out research & development projects under the Scheme:

a) Academic institutions & universities having MoU with BIS and faculties and research scholars thereof;
b) Member(s) of Technical Committees of BIS.

6.2 Faculties and research scholars shall submit proposals through their institute. Members of technical committees belonging to any association/organization shall submit the proposals through their association/organization. Members of technical committees in personal capacity can submit their proposals directly to BIS, however if carrying out a research & development project requires collaboration with any institution/organization, concurrence of the same shall also be submitted

7 PROCEDURE FOR APPLICATION

7.1 Submission of Proposal

7.1.1 Applications for undertaking research & development projects shall be submitted in the manner prescribed by the Bureau and within the prescribed timelines,

7.1.2 Proposer(s) shall submit their proposal in a “single stage - two envelope bid system” consisting of separately sealed “Technical and Financial proposals”. The Technical Proposal shall be submitted as per format prescribed in **Annex A** and the Financial Proposal shall be submitted in the format prescribed as per **Annex B**, clearly specifying expected expenditure against each element such as manpower, equipment (shall not include computer hardware and software), travelling, testing, consumables, stationery, overheads, etc.

7.1.3 There shall be maximum one proposal from one institute on a given subject.

7.1.4 No contractual obligation whatsoever shall arise until a formal agreement is signed and executed between the Bureau and the Proposer.

7.2 The proposals shall inter-alia consist of the following:

7.2.1 In respect of the research & development projects put up by the Bureau:

a) Details of the Project team along with the organization/institution associated with;
b) The CV of the Project leader and expert/expert(s) to be associated with the project and a letter from organization authorizing Project Leader and expert/expert(s) to undertake the research as proposed.
c) A write up on the understanding of the scope and objectives of the project.
d) Methodology (sampling size, if applicable) to be adopted for the proposed study with a clear road map and time plan for completion of the project;
e) Stage wise timelines for completion of the project.

7.2.2 In respect of research & development projects proposed by any expert/organization:

a) Details of the Project team along with the organization/institution associated with;
b) The CV of the Project leader and expert/expert(s) to be associated with the projects and a letter from organization authorizing Project Leader and expert/expert(s) to undertake the study as proposed.
c) Objective that will be achieved and scope of the project clearly highlighting the need of such study and what would be the final deliverable;
d) Methodology (sampling size if applicable) to be adopted for the proposed study with a clear road map and time plan for completion of the project;
e) Details of infrastructure facilities available for the project, in the institution and additional facilities required (if any) for carrying out research.
f) Stage wise timelines for the completion of the project.

7.3 The Head of the concerned institution while forwarding the application and nominating the project leader shall certify that:

a) the core facilities (land, buildings, laboratory, manpower and other infrastructure etc.) are available and will be provided to the Project Leader to work on the proposed project,
b) the organization will discharge all its obligations, particularly in respect of management of the financial assistance given, and
c) no other funding is being received/sought for the project proposed to be sanctioned by BIS.

8 PROCEDURE FOR APPROVAL WITHIN BIS

8.1 There shall be a Research Evaluation Committee (REC) to evaluate the proposals received, the composition of which shall be as follows:

DDG (PRT)	: Chairperson
Head (CMD) concerned	: Member
Head (LPPD)	: Member
Head of the Technical Department concerned	: Member
Director Finance	: Member
Two Experts from the Sectional Committee concerned	: Members
Head (SCMD)	: Member Secretary

*The experts shall be nominated by the Sectional Committee and the nominated members shall give a declaration to the effect that there is no conflict of interest with respect to the project.

8.2 The evaluation and selection will be as per Quality and Cost Based Selection (QCBS) method (Rule 192, GFR 2017) which is explained in **Annex C**.

8.3 The criteria for evaluation of technical proposal shall be as under:

Sl No.	**Criteria**	**Max. Marks**	**Score by REC**
1	Profile of key individual/individuals to be associated with the research project	**10**	
2	Experience of the individual/organisation in conducting research projects in the relevant discipline	**20**	
3	Understanding of Scope, Objectives and deliverables	**15**	
4	Methodology	**30**	
5	Work plan/Execution strategy	**15**	
6	Chapterisation, contents and lay out of the proposed report	**10**	
TOTAL		**100**	

Note: REC may call for a presentation by the proposers if deemed necessary.

8.4 The minimum qualifying marks shall be 70. All the proposals with marks below 70 shall be considered rejected.

8.5 REC may refer back, advise changes for reconsideration or reject any proposal.

8.6 REC shall open the financial proposals (bids) within 7 days from completion of technical evaluation.

8.7 A final score sheet of all the proposers shall be made as detailed in Annex C and the proposer getting the highest combined score shall be selected for awarding the project.

8.8 The member secretary (REC) shall send the selected proposals to DG/DDG Standardization concerned, as per their delegated powers, for consideration and approval for sanction of the project.

8.9 After the approval of project, the member secretary (REC) shall inform the concerned technical department and the proposer regarding the decision.

8.10 After the sanction of fund is approved, the draft agreement (prepared in line with model agreement given at **Annex D**, to be modified on case-to-case basis) shall also be prepared by the Member Secretary (Sectional Committee), clearly highlighting the payment term. The Head (Technical Department) shall sign the agreement on behalf of BIS in all cases.

8.11 In case the proposer to whom the project is awarded declines to take up the project, the Research project shall be awarded to the proposer getting the next highest combined score among the qualified proposers.

9 SIGNING OF AGREEMENT AND ISSUING OF SANCTION LETTER

9.1 After receipt of duly signed agreement from the proposer and after the receipt of the approval of competent authority, a sanction letter shall be issued by the concerned Head (Technical Department) to the organization/individual member. The project would be considered to have commenced from the date the sanction letter is issued.

10 FUNDING

10.1 The mode of payment for Research & development projects shall be as follows:

a) First instalment up to a maximum of 30 percent of the total approved project cost would be released after approval of the project.
b) Second instalment to the extent of 50 percent of the approved estimated cost would be released on the submission of progress report along with the report on utilization of the 75 percent of the fund and acceptance of the same by the Sectional Committee.
c) The balance amount shall be released after submission of the final project report along with utilization certificate for the fund released and its acceptance by the Sectional Committee.

10.2 Release of each instalment is subject to satisfactory progress, required stage - wise deliverables and submission of the Utilization Certificate (UC) as per Form GFR12-A of GFR 2017 along with the statement of expenditure (SoE) issued by the Competent Authority.

11 PROGRESS REPORT AND MONITORING OF PROJECT

11.1 The relevant Sectional Committees of BIS will monitor the progress of project to ensure that the project is progressing as per the planned arrangement. However, member secretary of the concerned Sectional Committee under overall coordination of HoD would be the controlling/link officer for Research & Development projects and would constantly monitor the progress of the project every 30-45 days. Any delay in implementation of project should be duly justified by the Project leader and shall be put up to Research Evaluation Committee (REC) for approval.

11.2 The Sectional Committee shall review and give its acceptance of the progress reports submitted, within 3 weeks.

12 SUBMISSION OF FINAL PROJECT REPORT (FPR)

12.1 The FPR must be detailed and should include information about:

a) the original objective(s) of the project,
b) how far these objective(s) have been achieved, and
c) how the results will benefit the development of the national standard(s) and
d) a copy of final working draft of the concerned standard(s) (wherever applicable)
e) include clear inferences, recommendations regarding their use in the proposed standards,
f) all references used, raw data of surveys, sampling, testing and experiments,
g) undertaking that all the information presented is authentic.

12.2 FPR received in BIS would be put up to the concerned Sectional Committee, which will take necessary action for preparation/revision of standard appropriately. The Project leader

shall assist in the disposal of comments received on the research project, draft standard and for the preparation of the finalized draft, as may be desired by the Sectional Committee.

12.3 The proposer shall submit the Project Completion Report (PCR), within one month of completion of project along with the Utilization Certificate of the fund released as per Form GFR 12-A of GFR 2017 and the statement of expenditure (issued by the Competent Authority -in case of Govt. organization / Charted Accountant in case of private organization).

13 RESULTS OF RESEARCH & DEVELOPMENT

13.1 Project Leader(s) would be encouraged to publish the results of research & development. While doing so, acknowledgement to the effect that financial assistance was received from BIS should be made in the research paper(s) published. BIS should be acknowledged in similar type of other published work/press reports.

13.2 One re-print of each research paper(s) published as a result of the work done under the BIS funds shall be sent to BIS as and when published.

14 INTELLECTUAL PROPERTY RIGHTS

14.1 Ownership of any intellectual property, including but not limited to confidential information, know-how, patents, copyrights, design rights, rights relating to computer software, and any other industrial or intellectual property rights, developed solely by Proposer shall be vested with that Party.

14.2 Ownership of any intellectual property, including but not limited to confidential information, know-how, patents, copyrights, design rights, rights relating to computer software, and any other industrial or intellectual property rights, developed solely by the Bureau shall be vested with that Party.

14.3 The Intellectual Property arising out as an outcome of research project undertaken under these guidelines shall be vested with Bureau.

15 OPERATION OF FUNDS

15.1 The utilization certificate of the funds received in previous instalment (if any) to BIS should be annexed with the Statement of all equipment, books, etc purchased out of the funds certified by the Head of the organization. The name, description of the equipment, cost in rupees, date of purchase, and the name of the supplier to be given in the list. The main purpose/function of the equipment may also be mentioned against each item.

15.2 Any unspent balance lying with the organization should be refunded to BIS after the finalization of the draft immediately, by means of demand draft or online transfer.

15.3 The Head of the concerned standardization department of BIS shall ensure that the project leader submits the utilization certificate in the manner prescribed in Form GFR 12-A of GFR 2017.

15.4 Head of the Standardization department shall also ensure that the operation of funds is monitored strictly as specified in **Annex E**. Further the Project Leader is also fully aware and shall adhere to the obligations of his/her as given in this procedure.

16 OTHER REQUIREMENTS

16.1 Organizations receiving financial assistance for research & development projects from BIS would have to maintain separate accounts for each research project.

16.2 In the event of a Project Leader's absence from his normal place of duty for two months at a stretch, the Head of the organization would need to immediately nominate an Alternate Project Leader(s) to supervise the implementation of the project and such a name has to be approved in advance by BIS. In any event, a Project Leader shall give prior notice to BIS of his intention to stay away from the project.

16.3 Items of equipment, etc should be purchased on the basis of the established rules and procedures of the entity/organization.

16.4 Stock register of all equipment, books, etc purchased out of the funds shall be maintained.

16.5 Any capital-intensive equipment/devices purchased using financial assistance from BIS for research & development projects shall be allowed to be retained by the proposer for their research activity etc.

16.6 The organization shall have to ensure that expenditure with respect to TA/DA are made only as per their own norms but under no circumstances the executive/business class air travel or stay in a five-star hotel is made. The overhead expenses should not be more than 20 percent of the cost of the project.

16.7 The Project Leader must ensure that the concerned organization's newsletter would carry information on the activities and accomplishments of the various projects funded by the BIS.

17 TERMINATION OF PROJECT:

The research & development project can be terminated in case of any of the following:

a) the approval of research & development project may be treated as withdrawn, if the sanctioned research & development project does not commence within one month from the date of receipt of the sanction letter, unless otherwise authorized by BIS;
b) A Proposer may request for the withdrawal of a research & development project even after commencement of the project. In such case the entire fund given till that date shall be refunded to the Bureau; and
c) if the Proposer fails to submit Progress report/Completed Project report within the prescribed timelines.

The REC shall take decision on all cases of termination.

18 RESOLUTION OF DISPUTES

Dispute Resolution: In case of any dispute that cannot be resolved amicably, it shall be referred to Sole Arbitrator appointed by the Director General of the Bureau of Indian standards, whose decision shall be final and binding upon both the parties. The provisions of the Arbitration and Conciliation Act, 1996, as amended from time to time, shall be applicable.

ANNEX A

TECHNICAL PROPOSAL

1. Name of the Proposer and Organization	
2. Project title	

3. Project leader

a) Title: Prof/Dr/Mr/Ms b) Name:		Sex M/F
c) Full official address		
Mobile/Telephone Fax E-mail		
d) Designation		
e) Date of birth		
f) Academic qualifications along with year of completion		
g) Experience		

4. Other members of the research team (give name, address, experience and academic qualifications for each member)

1. Name	Designation: Address: Experience: Academic Qualifications:
1. Name	Designation: Address: Experience: Academic Qualifications:

5. Research support availed/being availed/applied for by the Project leader from different sources, including BIS, during the last 5 years:

Funding agency	Title of the project and reference number	Duration (from mm/yyyy to mm/yyyy)	Percentage of time devoted /being devoted/to be devoted, in man months	Amount in lakh Rs.

6. Details of facilities available with the institute/organization w.r.t. the research & development project

Facilities	Relevance to project
1.	

7. Aims and significance of the project
(Include the current status of work in area, both in India and abroad, with appropriate reference list at the end; identify lacunae, define question to be investigated; list briefly specific objectives of investigation. ethical clearance be enclosed where necessary).

8. The CV of the Project leader and expert/expert(s) to be associated with the projects and a letter from organization authorizing Project leader and expert/expert(s) to undertake the study as proposed.

9. Objective that will be achieved and scope of the project clearly highlighting the need of such study and what would be the final deliverable.

10. Methodology (sampling size if applicable) to be adopted for the proposed study.
11. Road map (Stage wise timelines for the completion of the project) and time table for completion of the project
12. Plan of work, methods and techniques to be used.
13. List of awards and honours conferred on the Project leader with dates.
14. Deliverables
15. Declaration and attestation:

I certify that all the details declared here are correct and complete. Signature of Project leader	Date:

12. Certificate of the institution:

This is to certify that a) we have read the terms and conditions of the BIS Research & Development Guidelines necessary for the compliance of the same. b) the necessary institutional facilities are available and will be provided for the implementation of this research proposal being submitted to the BIS for funding. c) Full account of expenditure will be rendered by the institution.
Name of the head: of the institution Signature with date: Seal:

ANNEX B
FINANCIAL PROPOSAL FORMAT
[To be submitted on letterhead wherever applicable]

To:
Bureau of Indian Standards
Manak Bhavan, 9 Bahadur Shah Zafar Marg
New Delhi – 110002, India

Sub: Financial Proposal for Research & development Project on (Title: _____) for Bureau of Indian Standards (Research guidelines document no._____dated: ___-___-2023).

Dear Sir,

We are pleased to submit our Financial Proposal for Research & Development Project on (Title: _____) for Bureau of Indian Standards as per the terms and conditions of the Research & Development guidelines document (Ref No.: _____ dated: ___-___-2023).

1. We hereby declare that our financial proposal is unconditional in all respects.
2. Our financial proposal is as follows:

3. Cost of the Project:

Sl no.	Budget items	Amount
1	Manpower cost	
2	Consumables [Chemicals, samples, testing glassware, stationery, books etc, information search (from databases)]	
3	Equipment	
4	Travel	
5	Any other/Overhead expenses	
	Total project cost	

*Please write NA in case any item is not applicable
a) The prices should be quoted in Indian Rupees above by the proposer.
b) The quoted price should be inclusive of all applicable taxes and charges.
c) Fund shall be released after deducting TDS as per applicable provisions of GST and income tax.
d) Justification of cost (for each item of equipment, consumables and travel. Quotation(s) for equipment should also be enclosed).

Yours faithfully,

Date: (Signature of the Project leader)

Place: (Name and Designation of the proposer)

Name and Signature of the head of the institution
(Rubber seal of the proposer/institution/organization, as applicable)

ANNEX C

Stage 1: Evaluation of Technical Proposal:

a) The proposal will be evaluated against the criteria defined at clause 8 in these Guidelines. The proposer may be required to provide additional details as deemed necessary by the REC.
b) Upon technical evaluation of each proposal, "Technical marks" out of 100 marks will be assigned to every proposal.
c) The proposals with score 70 or more marks in technical evaluation, will qualify for the evaluation of the financial proposal.
d) The proposer with the highest marks in technical proposal will be awarded 100 "Technical Score" and subsequently other proposers will also be awarded "Technical Score" relative to the highest technical marks for the final composite score calculation purpose e.g., if the highest technical marks is 90 then "Technical Score" is (90/90) × 100 = 100, hence the proposer with highest technical marks will score 100 "Technical Score". Similarly, another proposer who scored 80 marks, will get (80/90) × 100 = 88.88 "Technical Score". Following formula will be used for the "Technical Score" (TS) calculation:

$$\text{Technical Score (TS)} = \frac{Proposer's\ Technical\ Marks}{Highest\ Technical\ Marks} \times 100$$

e) The details of technical evaluation parameters are provided at clause 9.

Stage-2 Evaluation of Financial Proposal

a) The evaluation will be carried out if financial proposals are complete and computationally correct.
b) Upon financial evaluation of each proposal, the lowest financial proposal will be awarded 100 "Financial score". The "Financial Score" of other proposer(s) will be computed by measuring the financial proposal against the lowest financial proposal. Following formula will be used for calculating "Financial Score":

$$\text{Financial Score (FS)} = \frac{Lowest\ Financial\ proposal}{Proposer's\ Financial\ Proposal} \times 100$$

Stage-3 Computation of Combined Score

The "Combines Score" is a weighted average of the Technical and Financial Scores. The ratio of Technical and Financial Scores is 70:30 respectively. The Combined Score will be derived using the following formula:

$$\text{Combined Score} = [(TS \times 0.70) + (FS \times 0.30)]$$

The responsive proposers(s) will be ranked in descending order according to the Combined Score, which is calculated based on the above formula. The highest-ranking proposer asper the Combined Score will be selected for award of Research Project.

ANNEX D

MODEL AGREEMENT

(To be modified on case-to-case basis)

This Deed of Agreement made this day of (Month & Year) between Bureau of Indian Standards having Head Office at Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi – 110 002 (hereinafter called 'BIS', which expression shall, wherever the context so admits, includes its successors and assigns) on one part and (name of the organization/expert) (hereinafter called which expression shall, wherever the context so admits, include their heirs, executors, administrators, legal representative and assigns) of the other part, witness as follows:

1. Whereas (name of the organization/expert) through (name of the Project Leader) has submitted a proposal to BIS pertaining to Research & development project titled for consideration and BIS has accepted the proposal.

2. That duration of the Research & development project shall be months with periodic and final reviews. The total cost of the project shall be Rs /- (Rupees in words) for the complete project. No further expenditure shall be borne by BIS on any account of this project including escalation of time.

3. The fund would be utilised for the specific project/assignment as approved by BIS and shall be spent within the specified time. Any portion of the fund which is ultimately not required for expenditure for the approved purpose shall be duly surrendered to BIS.

4. (Name of the organization/expert) shall not entrust the implementation of the project/assignment approved by BIS for which fund has been received to any other institution/expert or to divert the fund received from BIS as assistance to any other institution/expert/proposer.

5. (Name of the organization/expert) indemnifies BIS from any legal and/or financial encumbrance arising out of any infringement of IPR/licensing of IPR/technology transfer/commercialization.

6. (Name of the organization/expert) shall maintain an audited record in the form of a register for permanent, semi-permanent assets acquired solely or mainly out of BIS fund. Once the Research & development project is completed satisfactorily, the organization taking up the Research project may retain the equipment/devices for their Research & development activities, etc. The equipment procured through BIS fund should bear a label "BIS Funded".

7. BIS shall release the funds for the project as follows:

a) First instalment up to a maximum of 30 percent of the total approved project cost would be released after approval of the project.
b) Second instalment to the extent of 50 percent of the approved estimated cost would be released on the submission of progress report along with the report on utilization of the 75 percent of the fund and acceptance of the same by the Sectional Committee.
c) The balance amount shall be released after submission of the final project report along with utilization certificate for the fund released and its acceptance by the Sectional Committee.

8. The completion of the Research & development project shall remain the responsibility of (name of the organization/expert) even if the project leader is not available due to any reason whatsoever. After completion of the project, a Project Completion Report giving details (objective(s) achieved, raw data of surveys, sampling, testing and experiments) of shall be submitted by the Project leader the original objective(s) of the project,

9. (Name of the organization/expert) shall ensure the completion of the project under the guidance and supervision of any other faculty/researcher, if the nominated project leader would not be available due to any reason. Such a faculty member/researcher can only be nominated with the approval of BIS.

10. In case (name of the organization/expert) is unable to complete the project to the satisfaction of BIS in stipulated time or extended time and leads to termination of the research project, BIS shall be entitled to claim the refund of fund so sanctioned with interest @ 10 percent thereon from (name of the organization/expert).

11. The authority to extend the duration of the project shall rest with BIS.

12. BIS shall have the right to formulate monitoring methodology of the Research & development project.

13. Dispute Resolution: In case of any dispute that cannot be resolved amicably, it shall be referred to Sole Arbitrator appointed by the Director General of the Bureau of Indian standards, whose decision shall be final and binding upon both the parties. The provisions of the Arbitration and Conciliation Act, 1996, as amended from time to time, shall be applicable.

14. Undertaking given by project leader, if any, shall be part of the agreement.

15. (Name of the organization/expert) shall be responsible for discharge of all its obligations of the project through the nominated project leader or any other expert/expert(s) in case of necessity particularly in respect of management of financial assistance given to them. (Name of the organization/expert) shall refund any excess/unutilized amount of the fund to BIS.

16. Release of subsequent instalments is subject to satisfactory progress, required stage - wise deliverables and submission of the Utilization Certificate (UC) as per Form GFR12-A of GFR 2017 along with the statement of expenditure (SoE) issued by the Competent Authority.

17. (Name of the organization/expert) shall ensure that Project leader shall give presentation on the progress of project to BIS as and when directed by BIS for continuation of the project, and shall assist in the disposal of comments received related to the Research & development Project.

18. The project shall be deemed to have been commenced from the date of release of sanction letter.

19. (Name of the organization/expert) shall ensure that while publishing the results of research & development, acknowledgement to the effect that financial assistance so received from BIS be made in the research papers published/ other published work/ press reports.

20. Procedure for screening/evaluation, selecting, monitoring Research & development projects prescribed in "Guidelines for Research & Development Projects for Formulation and Review of Standards' shall be part of the agreement.

ANNEX E

OPERATION OF FUNDS AND PROGRESS REPORT

1. Title of the Project:	Project number:
2. Name & Address of Project leader:	Date of Commencement: dd/mm/yyyy

3. Details of Equipment Purchased (if any):

Name of equipment	Cost	Supplier	Date of purchase/ placing order for each item of equipment
NOTE - The equipment fund once fixed cannot be enhanced. Project leaders are advised to give authenticated estimates of the cost of equipment. Equipment should invariably be purchased within 1 month from the date of receipt of the fund and/or sanction letter.			

4. Fund received

.

5. Expenditure made in Rupees: (Please provide the details)

Expenditure	Amount	Taxes (as applicable)	Total
Manpower cost			
Consumables			
Equipment			
Travel			
Others			
Grand Total			

6. Amount saved (if any) from the last instalment: Rs .

7. Date on which scheme will complete its normal tenure of months .

8. Whether extension beyond normal tenure has been requested. Yes /No.

If yes, justification for extension and programme of work to be completed. Also mention as to why the work could not be completed as per the original plan.

{Extension beyond normal tenure should be requested at the Project Monitoring Session before end of tenure (as given in ToR)}.

9. Constraints (if any) faced in the progress of work and suggestions to overcome them.

10. Any deviation from original plan with its nature and cause.

11. List of publication giving full bibliographic details accrued from this project (copies of the paper (s) should be enclosed).

12. Summary of work done (200 words).

13. Proposed programme of work for the next month (1000 words).

14. Detailed Progress Report enlisting the objectives in beginning briefly (up to five pages maximum).

Signature of Project leader
Date:

Note: No column should be left blank; write not applicable (NA), wherever applicable.

TEMPLATE FOR THE TERMS OF REFERENCE FOR THE R&D PROJECTS
(*Refer to the Guidelines on R&D Projects issued vide note SCMD/R&D dated xx-09-23*)

1. **Title of the Project:** Mention the title of the project.

2. **Background:**

a) Mention the Technical Committee and Division Council the project is related to;
b) Mention the standard / document no. for the standard under development or review to which the project is related to;
c) Briefly explain the rationale for the commissioning of the project.

3. **Scope**: Mention the scope of the project.

4. **Expected Deliverables**: Mention the outcome of the project.

5. **Research Methodology**:
Mention the essential components of the methodology like mid-term review, focus group discussions, visits to the manufacturing units and/or laboratories, collection and testing of samples etc. with the details of the sample size for them as applicable.

6. **Requirement for the CVs:**

Mention the requirement for the CVs of the persons to be engaged for the project.

7. **Timeline and Method of Progress Review:**

Suggest the stagewise timelines including that for the submission of the first draft, final draft and the report and the mechanism for the review of the progress.

8. **Support BIS will Provide:**

Indicate the support BIS may provide in terms of the standards, other publications, information regarding manufacturers and labs etc.

ANNEX 5
(*Item* 5.1)
TERMS OF REFERENCE FOR THE R&D PROJECTSs

1 Title of the Project: Study of performance and constructional parameters of 'Cotton Tapes for Aeronautical Applications'.

2 Background

a) Textile Material for Aeronautical and Related Products Sectional Committee- TXD 13

b) The aeronautical applications of cotton tapes encompass reinforcing aircraft fabrics, under-rib lacing cord, parachute fabrication, and other equipment associated with aerial delivery. Consequently, the standard for 'cotton tapes for aeronautical applications' assumes a vital role in the manufacturing process, ensuring uniform performance, high quality, and adherence to constructional parameters for these cotton tapes.

c) BIS has published the following four standards for cotton tapes for aeronautical purposes :
    a) IS 714 :1992 Textiles-Cotton Reinforcing Tapes For Aerospace Purpose — Specification (Third Revision) ;
    b) IS : 3255 : 1979 Specification for scoured or dyed cotton tapes for aerospace purposes (first revision) ;
    c) IS : 3846 : 1984 Specification for rot-proofed cotton tapes for aerospace purposes (first revision) ;
    d) IS 14564 : 1998 Textiles- cotton tapes for personnel parachutes – Specification

d) The consideration arose for the establishment of a unified standard for cotton tapes in aeronautical applications. Consequently, a decision was made to consolidate all four Indian standards pertaining to cotton tapes into a single comprehensive standard. This amalgamation aims to encompass all varieties of cotton tapes manufactured in the country, while excluding any obsolete or unused variations.

3 Objective

To collect the technical data and scientific evidence for quality, performance and constructional requirement of Cotton Tapes for Aeronautical Applications from primary and secondary sources.

4 Scope

4.1 Study of the available literature on Cotton tapes for aeronautical Applications, but not restricted to the following:

a) International standard and regulation,
b) Journals and research papers,
c) Standard operating procedures (SOPs)/guidelines of users/regulators,
d) Studies conducted by any organization
e) Any other published information.

4.2 Collection of the database for manufacturers (small, medium and large-scale), testing infrastructure and users in the country.

4.3 Collection of import and exports data, type of standards and regulation being followed by domestic/foreign manufacturers, comparative analysis of these standards and regulation.

4.4 Undertake 2 visits to each of small, medium and large-scale industries, focused group discussion with (production, quality control and R &D team) manufacturer and collect the information on the following aspects :

a) Manufacturing process;
b) In-process controls being exercised during manufacturing;
c) Varieties being manufactured;
d) Standards being followed;
e) Testing method being used;
f) Testing infrastructure available;
g) Post manufacturing quality/in-house data for quality, performance and constructional parameter for all the varieties being manufactured;
h) Sampling plan being followed;
i) Marking and labelling of the product;
j) Packaging;
k) Sustainability practices [sustainable raw material, energy efficient processes and methodologies, renewable energy sources, 3Rs (Reduce, Reuse and Recycle), waste management and disposal mechanisms]
l) Focused group discussions with teams involved in production, testing, and R&D to address quality issues, discuss challenges faced, and gather suggestions for improvement.

4.5 The feedback from other manufacturers (where visit is not carried out) shall be collected by circulating questionnaire through email or any other digital means.

4.6 Undertake 2 visits to users and 2 visits to testing labs (both NABL accredited lab) to collect information including but not restricted to the following:

a) User

i) Standards and regulations being followed;
ii) Focused group discussion on quality issues, challenges being faced and suggestions if any.

b) Lab

i) Standards and regulation being followed;
ii) Testing methods being followed;
iii) Testing infrastructure;
iv) Focused group discussion on testing related issues, challenges being faced and suggestion.

4.7 Collection of 2 samples each from (small, medium and large-scale manufacturer) of each varieties and generation of test data for various parameters but not restricted to the following requirements for Cotton Tapes after getting the samples tested from 2 NABL accredited labs:

a) EPI;
b) PPI;
c) Mass;
d) Breaking load on full width;
e) Scouring loss,;
f) pH value;
g) Colour fastness to light and washing:;
h) GSM; and
i) Rot-proofness:

4.8 Preparation of analytical report of the entire scope.

5 Research Methodology:

5.1 Collect and analyse the data/information as specified in the **4.1**, **4.2** and **4.3**.
5.2 Visit manufacturers, users and labs and collect data/information as specified in **4.4, 4.5** and **4.6**.
5.3 Collect and test the samples as specified in the **4.7**.
5.4 Analyse the data/information and prepare a comprehensive project report.

6 Expected Deliverables

6.1 Comprehensive report in soft/hard form of study covering all the aspects detailed in the scope of the R & D project.
6.2 Questionnaire feedback, testing report, focused group discussion report, other relevant documents and information shall be appended to the project report.

7 Requirement for the CVs:

Graduate in textile technology or textile engineering or textiles chemistry or fibre science and technology or manmade fibre technology.

8 Timeline and Method of Progress Review:

Indicative Time line	**Method of progress**
0 to 20 days	Literature review, desktop study, collection of data and information. The sampling plan for visit and collection of samples shall be discussed and finalized with nodal officer after literature survey and desktop research.
21 to 60 days	Visit to manufacturer, user, testing lab and collection of samples.
61 to 104 days	Testing of samples (except long duration test with testing time

	more than 30 days) preparation and submission of first draft report
105 to 120 days	Submission of the final project report.

9 Support BIS will Provide:

a) All the relevant Indian Standards/ISO Standards or any other standards required during the project will be provided by BIS.
b) Facilitate/introduction of the project/organization to relevant Industry and industry association, testing lab, institute, academia, user, regulator/ministries.
c) Facilitate testing of samples in BIS Lab/BIS Recognized Lab.

10 Nodal Point:

In case of queries/clarification, Contact

Member Sect. TXD 13 : Shri Banothu Ranga ;
Mail: banothurenga@bis.gov.in ; Mob: 8639075790 ; Tel : 011-23238474

ANNEX 6 (a)
(*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 11326 : 1985

3. **Title:** Specification for nylon fabrics for coating with natural or synthetic elastomers

4. **Date of review:** 01 January 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 6359 : 1971 Method for conditioning of textiles.	IS 6359 : 2023 Method for conditioning of textiles (first revision)	It has been revised to incorporate the time interval for moisture equilibrium for testing and principle for rapid conditioning.	Latest version of the standard i.e. IS 6359 : 2023 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	Same Version	NA	NA

yarns spun on cotton system (first revision)			
IS 1963 : 1981 Methods for determination of threads per unit length in woven fabrics (second revision)	Same Version	NA	NA
IS 1964 : 1970 Methods for determination of weight per square metre and weight per linear metre of fabrics (first revision)	IS 1964 : 2001 Textiles – Methods for determination of mass per unit length and mass per unit area of fabrics (second revision)	It has been revised again to provide for removal of selvedge in case the fabric mass is different than that of selvedge.	Latest version of the standard i.e. IS 1964 : 2001 shall be referred in the revision and accordingly other changes will be made wherever required.
IS 1969 : 1985 Methods for determination of breaking load and elongation at break of woven textile fabrics (second revision).	IS 1969 (Part 1) : 2018 ISO 13934-1 Textiles – Tensile properties of fabrics – Part 1 Determination of maximum force and elongation at maximum force using the strip method (fourth revision)	This standard is superseded by ISO 13934-1	Latest version of the standard i.e. IS 1969 (Part 1) : 2018 shall be referred in the revision and accordingly other changes will be made wherever required.
IS 2454 : 1985 Method for determination of colour fastness of textile materials to artificial light (xenon lamp).	Same Version	NA	NA
IS 3361 : 1979 Method for determination of colour fastness of textile materials to washing: Test 2.	Same Version	NA	NA
IS 767 : 1956 Method for determination of colour fastness of	IS/ISO 105-E01:2013 Textiles — Tests for colour fastness — Part E01:	This standard is superseded by IS/ISO 105-E01:2013 Textiles — Tests for colour fastness — Part	Latest version of the standard i.e. IS/ISO 105-E01:2013 shall be referred in the revision and

textile materials to water.	Colour fastness to water	E01: Colour fastness to water	accordingly other changes will be made wherever required.
IS 4635 (Part 1) : 1968 Method for determination of colour fastness of textile materials to vulcanizing Part 1 With hot air	IS/ISO 105-S01:1993 Textiles — Tests for colour fastness — Part S01: Colour fastness to vulcanization: Hot air	This standard is superseded by IS/ISO 105-S01:1993 Textiles — Tests for colour fastness — Part S01: Colour fastness to vulcanization: Hot air	Latest version of the standard i.e. IS/ISO 105-S01:1993 shall be referred in the revision and accordingly other changes will be made wherever required.
IS 4635 (Part 1) : 1968 Method for determination of colour fastness of textile materials to vulcanizing Part 3 With open steam	IS/ISO 105-S03:1993 Textiles — Tests for colour fastness — Part S03: Colour fastness to vulcanization: Open steam	This standard is superseded by IS/ISO 105-S03:1993 Textiles — Tests for colour fastness — Part S03: Colour fastness to vulcanization: Open steam	Latest version of the standard i.e. IS/ISO 105-S03:1993 shall be referred in the revision and accordingly other changes will be made wherever required.
IS 4636 : 1969 Method for determination of colour fastness of textile materials to dry-heat treatments.	IS/ISO 105-P01:1993 Textiles — Tests for colour fastness — Part P01: Colour fastness to dry heat (excluding pressing)	This standard is superseded by IS/ISO 105-P01:1993 Textiles — Tests for colour fastness — Part P01: Colour fastness to dry heat (excluding pressing)	Latest version of the standard i.e. IS/ISO 105-P01:1993shall be referred in the revision and accordingly other changes will be made wherever required.
IS 3456 : 1966 Method for determination of water soluble matter of textile materials.	IS 3456 : 2022 Method for determination of water-soluble matter of textile materials first revision of IS 3456	In the present revision, apparatus as per the testing procedure and references to Indian Standards have been updated.	Latest version of the standard i.e. IS 3456 : 2022 shall be referred in the revision and accordingly other changes will be made wherever required.
IS 1954 : 1969 Methods for determination of length and width of fabrics (first revision).	IS 1954 : 1990 Determination of length and width of woven fabrics – Methods (second revision)	In this revision, another method based on measuring length and width of fabric in prevailing atmosphere and then correcting to standard atmosphere has been incorporated.	Latest version of the standard i.e. IS 1954 : 1990 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 of IS 4420	In this standard, Amendment 1 and apparatus as per the testing procedure have been updated.	Latest version of the standard i.e. IS 4420 : 2022 shall be referred in the revision and accordingly other changes will be made wherever required.
IS 1390 : 1984 Methods for determination of pH value of aqueous extracts of textile materials (first revision)	IS 1390 : 2022 ISO 3071 : 2020 Textiles Determination of pH of aqueous extract third revision of IS 1390	This standard is superseded by ISO 3071 : 2020	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 4202 : 1967 Method for determination of chloride content in textile materials.	IS 4202 : 2022 Method for determination of chloride content of textile materials first revision of IS 4202	In the present revision, apparatus as per the testing procedure and references to Indian Standards have been updated.	Latest version of the standard i.e. IS 4202 : 2022 shall be referred in the revision and accordingly other changes will be made wherever required.
IS 4203 : 1967 Method for determination of sulphate content in textile materials.	IS 4203 : 2022 Method for determination of sulphate content in textile materials first revision of IS 4203	In the present revision, apparatus as per the testing procedure and references to Indian Standards have been updated.	Latest version of the standard i.e. IS 4203 : 2022 shall be referred in the revision and accordingly other changes will be made wherever required.
IS 2194 : 1963 Code for seaworthy packaging of man-made fibre fabrics.	Same Version	NA	NA
IS 2195 : 1964 Code for inland packaging of man-made fibre fabrics and man-made fibre yarns.	Same Version	NA	NA
IS 1070 : 1977 Specification for water for general	IS 1070 : 2023 Reagent Grade Water	In this fourth revision, requirement for total organic and references,	Latest version of the standard i.e. IS 1070 : 2023 shall be referred in the

laboratory use (second revision)	Specification Fourth Revision	ICS No. have been updated.	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.	7	Sampling clause shall be incorporated.
INTERNAL (TXD)	BIS certification marking clause needs to be updated.	8	New clause for BIS certification marking shall be incorporated.

INTERNAL (TXD)	Packing clause to be modified as per current market practices.	9	Packing clause will be modified in the present revision.

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

s Any other observation:

i. ICS no. shall be specified on the first cover page instead of UDC, along with other editorial changes as per current practices in standard formulation.
ii. Clause no. 2 shall be specified for REFERENCES and other clauses will be renumbered subsequently or annex A shall be consisting of updated references to Indian Standards.
iii. Foreword shall be modified while revising the Indian standard.

Recommendations:

Based on the above observations, the committee may archive the standard.

ANNEX 6 (b)
(*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 4719 : 1984

3. **Title:** Specification for wire-woven rayon fabric for aerospace purposes (second revision)

4. **Date of review:** 01 January 2024

5. **Review Analysis**

viii) 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**

ix) 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 667 : 1981 Methods for identification of textile fibres (first revision).	Same Version	NA	NA
IS 440 : 1964	Same Version	NA	NA

Methods of chemical analysis of copper (revised)			
IS 1963 : 1981 Methods for determination of threads per unit length in woven fabrics (second revision)	Same Version	NA	NA
IS 1964 : 1970 Methods for determination of weight per square metre and weight per linear metre of fabrics (first revision)	IS 1964 : 2001 Textiles – Methods for determination of mass per unit length and mass per unit area of fabrics (second revision)	It has been revised again to provide for removal of selvedge in case the fabric mass is different than that of selvedge.	Latest version of the standard i.e. IS 1964 : 2001 shall be referred in the revision and accordingly other changes will be made wherever required.
IS 1954 : 1969 Methods for determination of length and width of fabrics (first revision)	IS 1954 : 1990 Determination of length and width of woven fabrics – Methods (second revision)	In this revision, another method based on measuring length and width of fabric in prevailing atmosphere and then correcting to standard atmosphere has been incorporated	Latest version of the standard i.e. IS 1954 : 1990 shall be referred in the revision and accordingly other changes will be made wherever required.
IS 1912 : 1975 Specification for country jute twine (first revision).	IS 1912 : 2023 Textiles Country jute twine - Specification (third revision)	In this revision, requirement for identification of material, test method for measuring the lubricant and amendment has been incorporated.	Latest version of the standard i.e. IS 1912 : 2023 shall be referred in the revision and accordingly other changes will be made wherever required.
IS 2508 : 1977 Specification for low density Polyethylene films (first revision)	IS 2508 : 2016 Polyethylene films and sheets - Specification (Third Revision)	In this standard; title, scope and types of polyethylene films/sheets have been incorporated.	Latest version of the standard i.e. IS 2508 : 2016 shall be referred in the revision and accordingly other changes will be made wherever required.
IS 3751 : 1966 Specification for heavy tee cloth.	IS 3751 : 1993 Textiles – Heavy cee jute cloth –	This standard is being revised so as to align it with	Latest version of the standard i.e. IS 3751 : 1993 shall be

	Specification (first revision)	IS 9113 : 1992 regarding general requirements and criteria of conformity.	referred in the revision and accordingly other changes will be made wherever required.
IS 2500 (Part 1) : 1973 Sampling inspection tables : Part 1 Inspection by attributes and by count of defects (first revision).	IS 2500 (Part 1) : 2000 ISO 2859-1:1999 Sampling procedures for inspection by attributes: Part 1 sampling schemes indexed by acceptance quality limit (AQL) for lot - By - Lot inspection (Third Revision)	This standard is superseded by ISO 2859-1:1999	Latest version of the standard i.e. IS 2500 (Part 1) : 2000 shall be referred in the revision and accordingly other changes will be made wherever required.

x) 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

xi) Technical comments on the standard received, if any

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

xii) 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)	Packing clause to be modified as per current market practices.	5	Packing clause will be modified in the present revision.
INTERNAL (TXD)	BIS certification marking clause needs to be updated.	6	New clause for BIS certification marking shall be incorporated.
INTERNAL (TXD)	Sampling clause needs to be updated.	7	Sampling clause shall be incorporated.

xiii) 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

xiv) Any consequential changes to be considered in other IS

Related IS to get impacted	Requirements to be impacted
NA	NA

1. Any other observation:

iv. ICS no. shall be specified on the first cover page instead of UDC, along with other editorial changes as per current practices in standard formulation.
v. Clause no. 2 shall be specified for REFERENCES and other clauses will be renumbered subsequently or annex A shall be consisting of updated references to Indian Standards.
vi. Foreword shall be modified while revising the Indian standard.

2. Recommendations:

Based on the above observations, the committee may archive the standard.