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BUREAU OF INDIAN STANDARDS
(NEW DELHI)

MINUTES

30th MEETING OF GEO-SYNTHETICS SECTIONAL COMMITTEE, TXD 30

Date/Day	**Time**	**Venue**
28 December, 2023 (Thursday)	1100 h	Through Video Conferencing

ATTENDEES:

1.	**Dr. A. N. Desai (*Chairman*)**	**Scientific Member, SITRA Council, Coimbatore**
2.	Prof. K. Rajagopal	Andhra University, Visakhapatnam
3.	Shri Satish Naik	Best Geotechnique Pvt Ltd, Mumbai
4.	Dr. Shanmugasundaram	Central Coir Research Institute, Alappuzha
5.	Smt. Sumy Sebastian	-do-
6.	Dr. R. Chitra	Central Soil and Materials Research Station, New Delhi
7.	Dr Manish Gupta	-do-
8.	Shri C. R. Devraj	Charankattu Coir Mfg. Co. (P) Ltd, Kerala
9.	Shri C. D. Athul Raj	-do-
10.	Dr. Swapan Kumar Ghosh	Department of Jute and Fibre Technology, Kolkata
11.	Dr. Shirish Kumar Vhanbatte	DKTE Centre of Excellence in Nonwovens, Ichalkaranji
12.	Shri Rajendra Ghadge	Garware Technical Fibers Ltd, Pune
13.	Smt. Lopamudra Datta	-do-
14.	Shri Ravikant Sharma	Geosynthetics Testing Services Pvt Ltd, Ahmedabad
15.	Dr. Sanjoy Debnath	ICAR- National Institute of Natural Fibre Engineering & Technology, Kolkata
16.	Prof. Amit Prashant	Indian Institute of Technology, Gandhinagar
17.	Shri Mohan Krishna Kolli	-do-
18.	Shri Bhudipta Saha	Indian Jute Mills Association, Kolkatta
19.	Dr. G. V. Rao	In Personal Capacity
20.	Shri P. K. Choudhury	In Personal Capacity
21.	Dr M. K. Talukdar	Kusumgar Corporates, Mumbai

22.	Dr. Anil Dixit	Landmark Material Testing and Research Laboratory Pvt. Ltd, Jaipur
23.	Dr. Ratnakar Mahajan	Macaferri Environmental Solutions Pvt Ltd, Navi Mumbai
24.	Smt. Minimol Korulla	-do-
25.	Shri Bidur Kant Jha	Ministry of Road Transport & Highways, New Delhi
26.	Shri M. Dutta	National Jute Board, Kolkatta
27.	Shri Soumyadipta Datta	Office of The Jute Commissioner, Kolkatta
28.	Shri Sivakumar S	Office of the Textile Commissioner, Mumbai
29.	Shri Amitaabh Goenka	Premier Polyfilms Ltd., Ghaziabad
30.	Shri Praveen Kumar	-do-
31.	Dr. K. Balan	Rajadhani Institute of Engineering & Technology, Trivandrum
32.	Shri Sanjay Kumar Awasthi	RDSO, Lucknow
33.	Shri V. Ravikanth	Reliance Industries Ltd, Mumbai
34.	Shri Vankata Mayur	Sahastra Engineers Pvt Ltd, Noida
35.	Shri Shahrokh Bagli	Strata Geosystems (I) Pvt Ltd, Mumbai
36.	Shri Suraj Vedpathak	-do-
37.	Shri Saurabh Vyas	Techfab India, Mumbai
38.	Dr. Prasanta K Panda	The Bombay Textile Research Association, Mumbai
39.	Shri Aniket Bhute	Archoma India Pvt. Ltd., Thane
40.	Smt. Ashwini Sudam	The Synthetics & Art Silk Mills Research, Association, Mumbai
BIS DIRECTORATE GENERAL:		
41.	Shri J. K. Gupta (Scientist E and Head, Textiles)	Bureau of Indian Standards, New Delhi
42.	Shri Himanshu Shukla (Scientist B & Member Secretary)	-do-
43.	Shri Abhishek Gupta (Executive Assistant)	-do-

Item 0 WELCOME AND INTRODUCTORY REMARK BY THE CHAIRMAN

0.1 Shri J K Gupta, HTXD, extended a warm welcome to the Chairman, all committee members, and invitees. He expressed his appreciation for the enthusiastic involvement of the members, in the committee works. He briefed to the participants about the R&D initiatives of BIS aiming to keep standards adaptable through field-level studies alongside traditional research methods,

ensuring their ongoing relevance. He urged the committee members to deliberate and finalize term of reference on the identified subject under the domain of this committee to facilitate progress in this direction. He further requested for the precise inputs on the agenda items so as to enable the committee to take appropriate decisions.

0.2 Dr. A N Desai, Chairman greeted and extended a hearty welcome to all the members and invitees present in the meeting. He highlighted the important subjects under the program of work of the committee and requested for the precise inputs from the members so as to arrive at consensus.

0.3 Member Secretary also extended a hearty welcome to the Chairman, HTXD and members of TXD 30.

0.4 In view of receipt of resignation by Dr. A. N. Desai from the chair of the committee, TXD 30. The committee requested Dr. A. N. Desai to continue serving as the chairman for Geosynthetics Sectional Committee, TXD 30, given his long expertise in the field of geosynthetics. The committee unanimously agreed for continuation of Dr. A. N. Desai as the chairman of TXD 30 and also acknowledged the accomplishments made under his chairmanship in formulating industry implementable standards.

Item 1 CONFIRMATION OF THE MINUTES OF THE PREVIOUS MEETING

1.1 In view of no comments received, the committee confirmed the minutes of the 29th meeting of the committee held on 20th July 2023 through videoconferencing, which were circulated vide letter No. TXD 30/A2.29 dated 01st August 2023.

Item 2 COMPOSITION AND SCOPE OF TXD 30

2.1 The committee reviewed the present scope and composition of TXD 30 as given in **Annex 1** to the agenda and decided as under :

a) To recommend TXDC, the withdrawal of following organizations due to their non-participation in committee meetings:

   i) Indian Institute of Technology, Delhi
   ii) Municipal Corporation of Greater Mumbai, Thane

b) Fresh nomination shall be sought from the following organizations:

   i) Indian Jute Industries' Research Association, Kolkata
   ii) National Highways Authority of India, Ghaziabad
   iii) Ministry of Road Transport and Highways, New Delhi

c) Prof. G. L Sivakumar Babu and Smt. Dola Roychowdhury will represent International Geosynthetics Society, India Chapter, New Delhi as principal member and alternate member respectively.

d) Dr. Sreekumar and Dr. Prasanta Kumar Panda will represent The Bombay Textile Research Association, Mumbai as principal member and alternate member respectively.

e) Dr. Shirish Kumar Vhanbatte will represent DKTE Centre of Excellence in Nonwovens, Ichalkaranji as principal member and name of the alternate member will be informed.

f) Prof. (Dr.) Swapan Kumar Ghosh and Dr. A. K. Singho will represent Department of Jute and Fibre Technology, Kolkata University, Kolkata as principal member and alternate member respectively.

g) Shri Soumyadipta Datta will represent Office of the Jute Commissioner, Kolkata as principle member and name of alternate member will be informed.

h) Dr. G.V. Rao informed during the meeting that he is associated with Indian Institute of Technology, Gandhinagar as Emeritus Professor and he will be representing IIT, Gandhinagar as alternate member.

2.2 The committee also considered the co-option request received from Shri Shivaji Walunj, Fastrack Dealcomm Pvt. Ltd., Silvassa as given in **Annex 2** to the Agenda.

After deliberations the committee did not agree to the co-option requests of above-mentioned industry on TXD 30 and emphasized on keeping industry representations not more than one third of total composition in order to safeguard consumer interests and maintain a balanced committee composition. However, the committee decided to include the above industry in the BIS mailing list for circulation of draft documents for their comments.

2.3 The committee considered the resignations received from Shri J. T Nashikkar, In personal capacity and Shri V. K. Patil, In personal capacity as given in **Annex 3** to the Agenda. The committee decided to recommend to TXDC, the withdrawal of the members based on the resignations received.

Item 3 ISSUES ARISING OUT OF THE PREVIOUS MEETINGS OF TXD 30

3.1 The committee noted the summary of actions taken on the decisions arrived at during 29th meeting of TXD 30 as given in **Annex 4** to the agenda.

Item 4 DRAFT STANDARDS/AMENDMENT FOR FINALIZATION

4.1 The committee considered the following draft standard as issued in wide circulation for two month for eliciting technical comments from stake vide our letter reference no.- TXD 30/22876 dated 10-07-2023 as given in **Annex 6** to the Agenda along with the comments received from

Garware Technical Fibers Ltd., Pune and Terre Armee, New Delhi as given in **Annex 5** to the Agenda.

i) Geosynthetics — Geotextile Tubes for Coastal and Waterways Protection —Specification [Doc TXD 30 (22876)]

After detailed deliberations, the committee decided to refer the comments to the panel assigned with the task of formulation of the draft standard and with the following composition for discussion/deliberation and for suggesting suitable amendments/changes to be incorporated in standard:

i) Prof. K Rajagopal, Andhra University, Visakhapatnam **(Convener)**
ii) Dr. Anup Rakshit, Indian Technical Textiles Association, Mumbai
iii) Shri Shahrokh Bagli, Strata Geosystems India Private Limited, Mumbai
iv) Shri Saurabh Vyas, Techfab India Industries Limited, Mumbai
v) Dr. Ratnakar Mahajan, Maccaferri Environmental Solutions Private Limited, Gurugram
vi) Shri Ravikanth Vetcha, Reliance Industries Limited, Mumbai
vii) Dr Prasanta Kumar Panda, The Bombay Textile Research Association, Mumbai
viii) Shri Ravikant Sharma, Geosynthetics Testing Services Private Limited, Ahmedabad
ix) Shri M. K. Srinivas, Ganga Flood Control Commission, Patna
x) Himanshu Shukla, Member Secretary, TXD 30

The committee further decided that the inputs/recommendation received from the above panel shall be placed before the committee during its next meeting for discussions and decisions.

Item 5 AMALGAMATION OF INDIAN STANDARDS ON GEOTEXTILES

5.1 The committee considered the revised draft (amalgamating IS 16391 : 2015, IS 16392 : 2015, IS 16393 : 2015, IS 16362 : 2020 and IS 15910 : 2010) as prepared by the panel constituted for the purpose in its meeting held on 12 December, 2023 under the convenorship of Dr. Swapan Ghosh, Department of Jute and Fibre Technology, Kolkata University, Kolkata and as given in **Annex 7** to the Agenda.

After deliberation the committee decided as follows:

a) Title of the standard shall be revised to encompass applications like drainage, separation, stabilization, erosion control and railways applications;
b) Scope of the standard shall be revised to cover the use of geotextiles for its use as separation and filtration application in railway formation.
c) Requirement table for railway applications shall be provided in a format similar to pavement applications.
d) Definition for Class 1, Class 2 and Class 3 shall be given based on severity/survivability conditions e.g. compaction, surface types, aggregate type of site etc.
e) To co-opt Dr. G V Rao, In personal Capacity and Strata Geosystems (I) Pvt Ltd, Mumbai in the panel constituted for the purpose.

f) To convene a panel meeting at the earliest to deliberate on the above points and prepare a revised draft.

Further the committee decided, the revised draft as prepared by the panel shall be issued for wide circulation for one month time period, eliciting the technical comments from the stakeholders. BIS may carry out the editorial changes in the draft if required.

Item 6 COMMENTS ON PUBLISHED INDIAN STANDARDS

6.1 The committee considered the comments received from Manak Manthan conducted by SUBO on the following standards as given in **Annex 8** to the Agenda:

a) IS 16391: 2015 'Geosynthetics — Geotextiles used in sub-grade separation in pavement structures — Specification'
b) IS 16392 : 2015 'Geosynthetics — Geotextiles for permanent erosion control in hard armor systems - Specification'
c) IS 16393 : 2015 'Geosynthetics — Geotextiles used in subsurface drainage application — Specification'
d) IS 16362 : 2020 'Geosynthetics — Geotextiles used in subgrade stabilization in pavement structures — Specification (first revision)'
e) IS 16090 : 2013 'Geo-synthetics — Geo-textiles used as protection (or cushioning) materials — Specification'.

After deliberation the committee decided as follows:

Comments	***Decision of committee***
UV stabilizer other than carbon black are also used	Amendments have already been issued to the standards, allowing the use of any suitable UV stabilizers, in addition to carbon black, during the manufacturing of geotextiles.
Elongation<50 % corresponds to woven and Elongation >50 % corresponds to non woven. Same should be clearly mentioned	Committee did not agree with the comment.

6.2 The committee considered the comments received from Tencate Geosynthetics, Gurgaon on 'IS 18309 : 2023 Geosynthetics — Prefabricated Vertical Drains for Quick Consolidation for Very Soft Plastic Soil — Specification' as given in **Annex 9** to the Agenda.

After detailed deliberation, the committee decided to refer the comments to the expert panel constituted under item **4.1** for discussion/deliberation and for suggesting suitable amendments/changes to be incorporated in standard.

The committee further decided that the inputs/recommendation received from the above panel shall be placed before the committee during its next meeting for discussions and decisions.

6.3 The committee considered the comments received from Polyon Textiles Pvt. Ltd, Mumbai on 'IS 17371: 2020 Geosynthetics — Geogrids for flexible pavements — Specification' as given in **Annex 10** to the Agenda.

After detailed deliberation, the committee noted that, a draft standard on 'Geosynthetic in Bitumen Layers for Flexible Pavements' is under development within the domain of this committee, which covers glass fibre paving grid and paving composite (pp nonwoven with glass fibre grid), hence the committee did not agree to the comment to incorporate the requirement of glass geogrid in IS 17371.

Item 7 REVIEW OF STANDARDS

The committee noted the inputs/comments received on the pre-2000 standards from BTRA, Mumbai, Landmark Material Testing and Research Laboratory Private Limited, Jaipur and Geosynthetics Testing Services Pvt Ltd, Ahmedabad as given in **Annex 11** to the Agenda.

After deliberation, the committee decided to suitably incorporate the comments in the drafts and circulate the drafts to the committee members for 15 days time period, seeking their comments/inputs on the drafts. The committee further decided in case no comments are received, the drafts shall be issued in wide circulation for a time period of 2 months eliciting the technical comments from stakeholders. BIS may carry out the editorial changes in the drafts if required.

Item 8 NEW WORK ITEM PROPOSAL

The committee considered the new proposal received from Terre Armee, New Delhi to formulate a new standard on the subject 'Fabric Form Concrete Mattress' as given in **Annex 12** to the Agenda. After deliberation, the committee decided that sufficient data has not been provided by the proposer on the subject and decided to ask the proposer to provide detailed information as per **Annex K** 'Proforma for proposing new subjects' along with user feedback, field trial reports and third party test reports.

Item 9 RESEARCH AND DEVELOPMENT ACTIVITY IN STANDARDIZATION

The committee scrutinized the draft Term of Reference (ToRs) for the revision of standard 'IS 14986 : Guidelines for Application of Jute Geotextile for Rain Water Erosion Control in Road and Railway Embankments and Hill Slopes' as given in **Annex 11** to the Agenda.

After deliberation, the committee prepared the ToR for the revision of standard IS 14986 as given in **Annex A** to the minutes for the approval by the review committee of BIS.

Item 10 ANY OTHER BUSINESS

10.1 The committee considered the draft standard on 'Coir non woven stitched composite geotextiles for erosion control applications' circulated as Addendum to the Agenda and as finalized by the panel constituted under the convenorship of CCRI, Alappuzha in its meeting held

on 13 December, 2023. After deliberation, the committee decided that BIS shall prepare the wide circulation draft, which shall be issued in wide circulation for a time period of two months eliciting technical comments from stakeholders. BIS may carry out any editorial changes in the draft, if required. The committee further decided to disband the panel constituted for the purpose.

10.2 The committee also noted the issue raised during the meeting for pocket size and confinement ratio in geocell as given in IS 17483 (Part 1) and IS 17483 (Part 2), after deliberation the committee decided as follows:

a) To issue an amendment to 'IS 17483 (Part 1):2020 Geosynthetics — Geocells — Specification (Part 1) Load Bearing Application' incorporating the following changes:

i) [*Page* 1, *clause* **3.2,** (*see also* Amendment No. 1)] — Substitute the following for existing:

'3.2 Style Number — A theoretical numerical identifier assigned to geocells, indicating their distinct design characteristics in terms of weld spacing (mm) and cell depth (mm). For instance, an "a × b" type geocell refers a geocell having weld spacing of 'a' mm and a cell depth of 'b' mm.

ii) [(Page 1, *clauses* **5.2** *and* **5.2.1**, (*see also* Amendment No. 1)] — Substitute the following for existing:

'**5.2** Geocells used for load bearing application shall have a depth ranging from 125 mm to 200 mm (*see* Note) and weld spacing ranging from 300 mm to 445 mm. The expanded individual geocell and geocell panel are shown in Fig. 2 (a) and Fig. 2 (b) respectively for illustration. The following tolerance shall be permissible for depth and weld spacing:

Dimension	*Tolerance*, Percent
Depth	$\left\{\begin{matrix}+3\\-2\end{matrix}\right\}$
Weld spacing	$\left\{\begin{matrix}+3\\-3\end{matrix}\right\}$

NOTE — In specific cases such as infilling with concrete or self-compacting material, geocells of depth above 200 and up to 300 mm may also be used.'

5.2.1 For effective confinement h/D_{eq} ratio shall be from 0.68 to 1.25. Equivalent diameter of the geocell pocket (D_{eq}) shall be measured by the formula as follows:

$$Deq = \frac{1}{2}\sqrt{d_1^2 + d_2^2}$$

where

h = depth of the geocell;
D_{eq} = equivalent diameter of the geocell pocket;
d_1 = length of the geocell pocket;
and d_2 = width of the geocell pocket.

The geocell pocket size [length (d_1) x width (d_2)] for geocell shall be measured as per the method given in Annex G.'

iii) A detailed method for measurement of geocell pocket size shall be incorporated as Annex G in the draft after receipt of inputs on test method for measuring geocell pocket size. Annex G shall be renumbered as Annex H.

iv) [Page 1, Fig. 2(c), (*see also* Amendment No. 1)] — Delete

BIS may carry out the editorial changes in the draft amendment, if required.

b) To issue an amendment to 'IS 17483 (Part 2) : 2020 Geosynthetics — Geocells — Specification (Part 2) Slope Erosion Protection Application' incorporating the following changes:

i) [*Page* 1, *clause* **3.2,** (*see also* Amendment No. 1)] — Substitute the following for existing:

'3.2 Style Number — A theoretical numerical identifier assigned to geocells, indicating their distinct design characteristics in terms of weld spacing (mm) and cell depth (mm). For instance, an "a × b" type geocell refers a geocell having weld spacing of 'a' mm and a cell depth of 'b' mm.'

ii) [Page 1, *clause* **5.2**, (*see also* Amendment No. 1)] — Substitute the following for existing:

'**5.2** Geocells used for slope erosion protection application shall have a depth ranging from 75 mm to 125 mm (*see* Note) and weld spacing ranging from 445 mm to 712 mm. The expanded individual geocell and geocell panel are shown in Fig. 2 (a) and Fig. 2 (b) respectively for illustration. The following tolerance shall be permissible for depth and weld spacing:

Dimension	*Tolerance*, Percent
Depth	$\begin{Bmatrix} +3 \\ -2 \end{Bmatrix}$
Weld spacing	$\begin{Bmatrix} +3 \\ -3 \end{Bmatrix}$

NOTE — In specific cases, geocells with 150 mm depth may also be used.'

iii) [Page 1, Fig. 2(c), (*see also* Amendment No. 1)] — Delete

BIS may carry out the editorial changes in the draft amendment, if required.

The committee further decided that as matter is urgent and non-controversial, the wide circulation of the above amendments at Sl. No. (a) and (b) be waived off under Rule 22 (4) of BIS Rules

2018 notified vide GSR 584(E) dated 25 June 2018; and draft amendments be held to have been FINALIZED for publication.

10.3 There being no other business, the meeting ended with a hearty vote of thanks to the ***Chair.***

ANNEX 1
(*Item* 9)

TERMS OF REFERENCE FOR THE R&D PROJECT

[**Technical Committee**: Geosynthetics Sectional Committee, TXD 30]

1. **Title of the Project:** To study the constructional and performance requirements for jute geotextiles used in rain water erosion control in road and railway embankment and hill slopes.

2. Background

Jute geotextiles are often used preventing surface runoff, reducing soil erosion, and promoting the growth of vegetation in roads and railway embankments and hill slopes. These geotextiles serve as a protective layer against erosion by stabilizing the soil and preventing it from being washed away by rainwater. They are placed over the soil surface to reinforce it, allowing water to pass through while minimizing soil movement and retaining its structure.

BIS has published IS 14986:2001 ‘Guidelines for application of Jute Geotextile for rain water erosion control in road and railway embankments and hill slopes’. The standard presently specifies 3 types of JGT i.e. 730, 500 and 292 GSM JGT.

Following an Industry Interaction session on "Jute Geotextiles – A Sustainable Geotechnical Solution," feedback from Jute Stakeholders suggested the need to split the standard into two parts. One part will cover guidelines, while the other will address product requirements, specifically focusing on Open Weave JGT for rainwater erosion control in road and railway embankments and hill slopes.

Further a testing challenge was encountered in determining the minimum breaking load and maximum elongation at break, particularly with 20 yarns and a 20 cm grip length with Goodbrand Fabric Testing Machine, as outlined in the existing standard. In response to feedback, the technical committee decided to incorporate fresh results obtained from breaking load and elongation tests conducted in accordance with IS 16635, titled 'Wide Width Tensile Test.'

Additionally, the standard will undergo revisions to align with the latest industrial practices. It will also incorporate information on newer varieties of JGT, ensuring that the document reflects the evolving landscape of Jute Geotextile applications. This comprehensive revision aims to enhance the standard's relevance in today’s context.

The outcome of the R&D project will serve as the basis for revision of IS 14986:2001 ‘Guidelines for application of Jute Geotextile for rain water erosion control in road and railway embankments and hill slopes’ to incorporate the fresh requirements for constructional and performance requirements and revise the standard as per the latest industrial practices.

3. Scope

a) Undertake study and analyse the existing literature on the subject, which include but not restricted to the following: -

   i) National/International standard and regulation,
   ii) Journals and research papers,
   iii) Standard operating procedures (SOPs)/guidelines of Ministry/regulator/users,
   iv) Studies/research conducted by any organization,
   v) Any other relevant published information.

b) Collection of the database for manufacturers (medium and large-scale), testing infrastructure and users in the country.
c) Collection of import and export data, type of standards and regulation being followed by domestic/foreign manufacturers, comparative analysis of these standards and regulation.
d) Undertake 4 visits to each of medium and large-scale manufacturer and collect the information on the following aspects: -

   i) Types/grades of raw material being used
   ii) Manufacturing process
   iii) In-process controls being exercised during manufacturing
   iv) Varieties being manufactured (based on Weave type, GSMs, thickness etc.)
   v) Standards being followed
   vi) Testing method being used
   vii) Testing infrastructure available
   viii) Post manufacturing quality/in-house data for safety, performance and constructional parameter for all the varieties being manufactured
   ix) Sampling plan being followed
   x) Marking and labelling of the product
   xi) Packaging practices being followed
   xii) Sustainability practices [sustainable raw material, energy efficient processes and methodologies, renewable energy sources, 3Rs (Reduce, Reuse and Recycle), waste management and disposal mechanisms]
   xiii) Focused group discussions with teams involved in production, testing, and R&D to address quality issues, discuss challenges faced, and gather suggestions for improvement

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

e) Undertake 2 visits to users and 2 visits to testing labs (one govt and one private NABL accredited lab) to collect information including but not restricted to the following: -

User

i) Standards and regulations being followed
ii) Compliance mechanism being followed (test certificate from supplier, third party testing)
iii) Installation methods/guidelines followed
iv) Focused group discussion on quality issues, challenges being faced and suggestions if any.

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

The feedback from users and labs (govt and private NABL accredited) where visit is not carried out shall be obtained through suitable questionnaire covering above information.

f) Purchase/collect samples and testing of samples for parameters including but not restricted to construction type, GSM, length, width, Ends/dm, Picks/dm, thickness, aperture size, minimum breaking load and maximum elongation (tested as per IS 16635 wide width elongation method in both machine and cross direction), as per following sampling plan:

Sl. No.	Number of samples	Type of Industry
1	02 of each variety (730, 500 and 292 GSM JGT)	Large scale
2	02 of each variety (730, 500 and 292 GSM JGT)	Medium scale
Total	12 Samples (06 samples to be tested in Govt Lab and 06 samples to be tested in Pvt. Lab)	

g) Preparation of a comprehensive project report covering all the above information.

4. Research Methodology: -

a) Collect and analyze the data/information as specified in the scope [4 (a), (b) and (c)].

b) Visit manufacturers, users and labs and collect data/information as specified in the scope [4 (d) and (e)].
c) Collect and test the samples as specified in the scope 4 (f).
d) Analysis the data/information and prepare a comprehensive project report.

5. Expected Deliverables: -

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

6. Requirement for the CVs: -

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

7. Timeline and Method of progress Review: -

The duration of the project is 120 days from the date of the award of the project. The stagewise indicative timelines are as follows:

Indicative Time line	**Method of progress**
0 to 20 days	Literature review, desktop study, collection of data and information Note — 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
60 to 100 days	Testing of samples (except long duration test with testing time more than 30 days) Preparation and submission of first draft report
100 to 120 days	Submission of the final project report

8. 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 leader/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.

9. Nodal Point

In case any queries/clarification, Shri Himanshu Shukla, Sc-B & Member Secretary, TXD 30 may be contacted on txd@bis.gov.in.