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BUREAU OF INDIAN STANDARDS
(NEW DELHI)

MINUTES

31st MEETING OF GEO-SYNTHETICS SECTIONAL COMMITTEE, TXD 30

Date/Day	**Time**	**Venue**
09 August, 2024 (Friday)	1100 h	Through Video Conferencing

ATTENDEES:

1.	**Dr. A. N. Desai (Chairman)**	**Scientific Member, SITRA Council, Coimbatore**
2.	Smt. Deepali Plawat	Ahmedabad Textile Industries Research Association, Ahmedabad
3.	Shri Jigar Dave	-do-
4.	Prof. K. Rajagopal	Andhra University, Visakhapatnam
5.	Shri Satish Naik	Best Geotechnique Pvt Ltd, Mumbai
6.	Dr. P. S. Prasad	CSIR - Central Road Research Institute, New Delhi
7.	Dr. Shanmugasundaram	Central Coir Research Institute, Alappuzha
8.	Smt. Sumy Sebastian	-do-
9.	Dr R Chitra	Central Soil and Materials Research Station, New Delhi
10.	Dr Manish Gupta	-do-
11.	Shri C. R. Devraj	Charankattu Coir Mfg. Co. (P) Ltd, Kerala
12.	Dr. Shirish Kumar Vhanbatte	DKTE Centre of Excellence in Nonwovens, Ichalkaranji
13.	Shri Amitabh Prabhakar	Ganga Flood Control Commission, Patna
14.	Shri Rajendra Ghadge	Garware Technical Fibers Ltd, Pune
15.	Shri Ravikant Sharma	Geosynthetics Testing Services Pvt Ltd, Ahmedabad
16.	Prof. G. L Sivakumar Babu	International Geosynthetics Society, New Delhi
17.	Smt. Dola Roychowdhury	-do-
18.	Smt. Soumita Chowdhury	Indian Jute Industries Research Association, Kolkata
19.	Shri Bhudipta Saha	Indian Jute Mills Association, Kolkata
20.	Dr. Sanjoy Debnath	ICAR- National Institute of Natural Fibre Engineering & Technology, Kolkata
21.	Dr. Anup Rakshit	Indian Technical Textiles Association, Mumbai
22.	Smt. Ruchita Gupta	-do-

23.	Shri Pradip Kumar Choudhury	In Personal Capacity
24.	Shri V N Gore	In Personal Capacity
25.	Dr. Anil Dixit	Landmark Material Testing and Research Laboratory Pvt. Ltd, Jaipur
26.	Dr. Ratnakar Mahajan	Macaferri Environmental Solutions Pvt Ltd, Navi Mumbai
27.	Smt. Minimol Korulla	-do-
28.	Smt. Padmaja Gurram	-do-
29.	Shri Bidur Kant Jha	Ministry of Road Transport & Highways, New Delhi
30.	Shri Mahadeb Datta	National Jute Board, Kolkata
31.	Shri Soumyadipta Datta	Office of The Jute Commissioner, Kolkatta
32.	Shri Sivakumar S	Office of the Textile Commissioner, Mumbai
33.	Dr. K. Balan	Rajadhani Institute of Engineering & Technology, Trivandrum
34.	Shri V. Ravikanth	Reliance Industries Ltd, Mumbai
35.	Shri Vinod Kumar	-do-
36.	Shri Chetan Patil	-do-
37.	Shri Santosh Kumar Ojha	Research Designs and Standards Organization (RDSO), Lucknow
38.	Shri Venkata Mayur	Sahastra Engineers Pvt Ltd, Noida
39.	Shri Narender Dalmia	Strata Geosystems (I) Pvt Ltd, Mumbai
40.	Shri Shahrokh Bagli	-do-
41.	Shri Suraj Vedpathak	-do-
42.	Shri Saurabh Vyas	Techfab India, Mumbai
43.	Dr. Prasanta K Panda	The Bombay Textile Research Association, Mumbai
44.	Dr. Manisha Mathur	The Synthetics & Art Silk Mills Research, Association, Mumbai
45.	Smt. Ashwini Sudam	-do-
BIS DIRECTORATE GENERAL:		
46.	Shri J. K. Gupta (Scientist E and Head, Textiles)	Bureau of Indian Standards, New Delhi
47.	Shri Himanshu Shukla (Scientist B & Member Secretary)	-do-
48.	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 informed the participants about the newly launched IRD portal and requested for active participation in international activities, including submitting comments on ballots received through the IRD portal and engaging in new work item proposals.

0.2 Dr. A N Desai, Chairman greeted and extended a hearty welcome to all the members and invitees present in the meeting. He also encouraged members for active participation of committee members at ISO work representing India's interest in the field of geosynthetics at international level. 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.

Item 1 CONFIRMATION OF THE MINUTES OF THE PREVIOUS MEETING

In view of no comments received, the committee confirmed the minutes of the 30th meeting of TXD 30 held on 28 December 2023 through videoconferencing, which were circulated vide letter No. TXD 30/A2.30 dated 06 February 2024.

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 cooption of Central Water Commission, New Delhi at TXD 30. Nominations for principal and alternate member shall be sought from the organization.
b) Dr. Shanmugasundaram O.L. and Smt. Sumy Sebastian will represent CCRI, Kalavoor as principal member and alternate member respectively.
c) Shri S. K. Rajan and Shri N. N. Shankar will represent Ganga Flood Control Commission, Patna as principal member and alternate member respectively.
d) Shri Vinod Kumar R and Shri Chetan Patil shall represent Reliance Industries Limited, Mumbai as principal member and alternate member respectively.
e) Dr. P. S. Prasad and Dr. Parvati G. S will represent Central Road Research Institute, New Delhi as principal member and alternate member respectively.
f) Fresh nominations shall be sought from Kusumgar Corporates, Mumbai for principal and alternate members.

2.2 The committee also considered the co-option requests received from Khator Technical Textiles Limited, Mumbai and Plastindia Foundation, Mumbai as given in **Annex 2** to the Agenda.

After deliberations the committee did not agree to the co-option requests of above-mentioned organizations on TXD 30 in view of having sufficient representation from Industries 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.

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 30th meeting of TXD 30 as given in **Annex 3** to the agenda.

Item 4 DRAFT STANDARDS/AMENDMENT FOR FINALIZATION

4.1 The committee considered the draft standard on 'Geosynthetics — Geotextiles for Drainage, Separation, Filtration, Erosion Control and Stabilization Applications — Specification [Doc. No. TXD 30 (25076)]' as issued in wide circulation for two months for eliciting technical comments from stakeholders as given in **Annex 4** to the Agenda. The committee also considered the comments received from Garware Technical Fibers Ltd., Pune and Terre Armee, New Delhi as given in **Annex 5** to the Agenda.

After detailed deliberations, the committee decided as follows:

a) Rewrite the foreword in consultation with Dr. Ratnakar Mahajan, Macaferri Environmental Solutions Pvt Ltd, Navi Mumbai Shri V. N. Gore, In personal capacity, Smt. Dola Roychowdhury, IGS, New Delhi (India chapter).
b) To rewrite, clause 4.2, sentence 3 as follows:

   'Polyolefin material shall be UV stabilized by adding suitable UV stabilizer and/or carbon black. Polyolefin material, if manufactured by using carbon black shall contain 2 percent to 3 percent of carbon black by mass with satisfactory dispersion'

c) To update the reference for CBR puncture strength to IS 16078.
d) To delete the requirement for burst strength
e) To add the following note to Table 6:

   'Note — In such circumstances, if it is not possible to cover the geotextile within two-weeks, adequate protection/cover shall be provided to protect the geotextiles against UV exposure.'
f) The existing values for the apparent opening size shall be substituted with the new values as specified below:

Sl. No.	Existing AOS	New AOS
1	0.85	0.850
2	0.60	0.600

3	0.43	0.425
4	0.25	0.250
5	0.22	0.212

The committee further decided that the above draft is held to have been FINALIZED for publication as Indian Standard after incorporating the above-mentioned changes. BIS may carry out the editorial changes in the draft, if required.

4.2 The committee scrutinized the following draft standards as issued in wide circulation for two months for eliciting technical comments from stake holders, as given in Annex 6 to the Agenda:

a) Geotextiles — Methods of Test: Part 2 Determination of Resistance to the Exposure of Ultraviolet Light, Moisture and Heat (Xenon-Arc Type Apparatus) [TXD 30 (25136)] (*first revision of* IS 13162 (Part 2) : 1991)
b) Geosynthetics — Method for Determination of Trapezoid Tearing Strength [TXD 30 (25137)] (*first revision of* IS 14293 : 1995)
c) Geosynthetics — Method for Determination of Apparent Opening Size by Dry Sieving Technique [TXD 30 (25138)] (*first revision of* IS 14294 : 1995)
d) IS 14714 Geotextiles — Determination of Abrasion Resistance [TXD 30 (25139)]
e) IS 14706/ISO 9862: 2023 Geosynthetics — Sampling and Preparation of Test Specimens [TXD 30 (25140)] (*first revision of* IS 14714 : 1999)
f) Geotextiles and Geotextile-Related Products — Determination of Water Permeability Characteristics Normal to the Plane, Without Load [TXD 30 (25141)] (IS 14324/ISO 11058: 2019)
g) Geosynthetics — Determination of Friction Characteristics Part 1: Direct Shear Test [TXD 30 (25142)] (IS 13326 Part 1/ISO 12957 Part 1: 2018)
h) IS 13162 Part 4/ISO 13433: 2006 Geosynthetics — Dynamic Perforation Test (Cone Drop Test) [TXD 30 (25143)] (IS 13326 Part 1/ISO 12957 Part 1: 2018)

After deliberation, the committee decided that, in view of no comments received above drafts are held to have been finalized for publication. BIS may carry out the editorial changes in the drafts, if required.

4.3 Draft Standard on Geotextile Tubes for Coastal and Waterways Protection

The committee considered the wide circulation draft on ‘Geotextile Tubes for Coastal and Waterways Protection’ as given in Annex 7 to the Agenda The committee also considered the recommendation of the panel constituted under the convenorship of Prof. Rajagopal K along with the test reports for grab tensile strength and trapezoidal tear strength for Inner Layer (Nonwoven) of Geo-tube as given in Annex 8 to the Agenda.

After detailed deliberation, the committee decided as follows:

a) To rewrite the clauses **3.3**, **4.1.2** and **4.1.3** as follows:

3.3 Fill Port — Also called a fill spout or fill nozzle, fill ports are sleeves sewn into the top of the geotextile tube into which the discharge pipe is inserted. Ports are typically 300 mm to 450 mm in diameter and 1.0 m to 1.5 m length. Ports are spaced along the top of the tube to provide access to the contractor.

4.1.2 The standard geotextile tube shall be made of soil tight, permeable and high strength woven geotextile sheets sewn along the edges with inlets sewn at regular intervals. If required, the tubes may be designed as inner and outer tube. The inner tube (if required) may be of nonwoven fabric that acts as a filter to retain the fine-grained material requirements and shall conform to requirements as specified in Table 2. The outer layer shall be made from high-strength woven fabric to withstand the weight of the fill material and the pumping pressure necessary to fill the tube to the required height.

4.1.3 The fill port shall be made of the same geotextile as of the main geotextile tube. The spacing between the fill ports shall usually be no closer than 5 m to accommodate sand slurry but can be as far apart as 30 m for some viscous fill materials. The end filling ports shall be maximum 2.50 m away from the edge of the tube. There shall be another safety pocket outer to spout/port so that it can be kept safely inside this cover/sack after filling to avoid floating/laying in the geotextile tube.

Notes

1 A scour apron may be provided at the base of geotextile tube to protect the foundation of the main geotextile tube from the undermining effects of scouring, and to reduce local erosion and scour caused during the hydraulic filling process. The requirements for scour apron shall be as per agreement between buyer and seller.
2 All property values except elongation and apparent opening size in this standard represent minimum values. Average of test results from any sampled tube in a lot shall meet or exceed the minimum values specified in this standard. The values for elongation and apparent opening size, represent the maximum values.

b) The requirement for grab tensile strength and trapezoid tear strength for of Inner Layer (Nonwoven) of Geotextile Tube shall be as follows:

Characteristic	**Requirement**	**Method of Test, Ref to**
Grab tensile strength, N, *Min*		IS 16342
a) Machine direction	500	
b) Cross machine direction	500	
Trapezoidal tear strength, N, *Min*		IS 14293
a) Machine direction	200	
b) Cross machine direction	200	

c) The units given in Table 5 shall be changed to SI units.
d) The diagrams of geotubes shall be given in the standard for indicative purpose only.

The committee further decided that the above draft is held to have been finalized for publication as Indian Standard after incorporating the above-mentioned changes. BIS may carry out the editorial changes in the draft, if required.

Item 5 INTERNATIONAL ACTIVITY

5.1 The committee considered the latest version of ISO standards published by ISO TC 221 'Geosynthetics' which are adopted as Indian Standards as given under item 5.1 to the Agenda.

After detailed deliberation, the committee decided to align the Indian Standards with the latest version of following ISO standards:

i) ISO 13426-2 : 2024 Geotextiles and geotextile-related products — Strength of internal structural junctions — Part 2: Geo-composites
ii) ISO/TS 20432 : 2022 Guidelines for the determination of the long-term strength of geosynthetics for soil reinforcement
iii) ISO 12958-1 : 2020 Geotextiles and geotextile-related products — Determination of water flow capacity in their plane — Part 1: Index test
iv) ISO 12958-2 : 2020 Geotextiles and geotextile-related products — Determination of water flow capacity in their plane — Part 2: Performance test
v) ISO 12960 : 2020 Geotextiles and geotextile-related products — Screening test methods for determining the resistance to acid and alkaline liquids

The committee further decided that BIS shall prepare the wide circulation drafts of above standards which 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.

5.2 The committee considered the list of new standards published by ISO TC 221 'Geosynthetics' in the field of Geosynthetics as given under item **5.2** to the Agenda, and after deliberation, decided as follows:

a) Following standards are relevant in Indian context and based on their usefulness and widespread applicability as test method standards for various geosynthetic products, the committee recommended for their adoption the standards under dual numbering system:

Sl. No.	ISO Standards	Relevance/Usefulness
i)	ISO/TS 18198 : 2023 Determination of long-term flow of geosynthetic drains	This standard specifies the test method for determination of long-term performance of geosynthetic drainage materials, including geonets, cuspated cores, and drainage liners. BIS is developing a product standard for drainage composite that will include hydraulic requirements such as permeability, AOS values, and long-term flow. The test method in this standard will be referred to ensure the durability and effectiveness of these products in real-world applications. Additionally, it was informed that this testing

		facility is widely available across industry and laboratories in India.
ii)	ISO 12956 : 2019 Geotextiles and geotextile-related products — Determination of the characteristic opening size (wet sieving)	The standard specifies an alternative to the existing Apparent Opening Size (AOS) test method for determination of characteristic opening size (COS) in geotextiles using the wet-sieving principle. This method provides an accurate measure of the effective pore size and the material's filtration performance, ensuring that the geotextile can retain soil particles while allowing water flow, which is critical for applications such as drainage and erosion control and will be referred in various product standards e.g. geotextiles, geobags, geotubes etc. in view of their applications in wet site conditions. The committee noted that COS testing facility is available across industry and laboratories domestically.
iii)	ISO/TS 13434 : 2020 Geosynthetics — Guidelines for the assessment of durability	This standard is important for assessing the durability of geosynthetics by providing design engineers with essential information on material property changes and safety factors needed to ensure the geosynthetic's expected design life. It is particularly useful for evaluating long-term performance in applications where longevity is critical, such as highways and railways, where durability over 25, 50, or even 100 years is a key requirement.
iv)	ISO 18325 : 2015 Geosynthetics — Test method for the determination of water discharge capacity for prefabricated vertical drains	This standard specifies the test method for determination the water discharge capacity of prefabricated vertical drains (PVDs), providing a standardized method for conformance and acceptance testing. BIS has published a standard for PVD that refers to an alternative method for measuring discharge capacity in horizontal test condition. The ISO test method will ensure that PVDs are evaluated using internationally recognized method ensuring their acceptance and reliability. For this test, it was informed that, the manufactures are having in house testing facilities.
v)	ISO 25619-2 : 2015 Geosynthetics — Determination of compression behaviour — Part 2: Determination of short-term compression behaviour	This standard provides a method for determining the short-term compressive behavior of geosynthetics, including their deformation under compressive stress following exposure to stress, liquids, or light which ensures evaluation of a specimen's ability to withstand compressive loads, which is important for assessment of material performance.

b) The committee decided that following standards shall be reviewed by the working group TXD 30.W03 constituted under the convenorship of Prof. Rajagopal. K., Andhra University, Visakhapatnam and requested working group to suggest for their applicability, relevance and adoption in the Indian context:

i) ISO/TR 18228-1 : 2020 Design using geosynthetics — Part 1: General
ii) ISO/TR 18228-2 : 2021 Design using geosynthetics — Part 2: Separation
iii) ISO/TR 18228-3 : 2021 Design using geosynthetics — Part 3: Filtration
iv) ISO/TR 18228-4 : 2022 Design using geosynthetics — Part 4: Drainage
v) ISO/TR 18228-6 : 2023 Design using geosynthetics — Part 6: Protection
vi) ISO/TR 18228-7 : 2021 Design using geosynthetics — Part 7: Reinforcement
vii) ISO/TR 18228-9 : 2022 Design using geosynthetics — Part 9: Barriers
viii) ISO/TR 18228-10 : 2024 Design using geosynthetics — Part 10: Asphalt pavements
ix) ISO 13437 : 2019 Geosynthetics — Installing and retrieving samples in the field for durability assessment
x) ISO 22182 : 2020 Geotextiles and geotextile-related products — Determination of index abrasion resistance characteristics under wet conditions for hydraulic applications
xi) ISO 25619-1 : 2021 Geosynthetics — Determination of compression behaviour — Part 1: Compressive creep properties

The details of the working group are as follows:

a) Working group title and number: Working group for formulation of new standards on geosynthetics, TXD 30.W03
b) Working group type: Adhoc
c) Timeframe: 8 months from the date of meeting
d) Scope:

'To identify, prepare, review, discuss on working drafts on new subjects or emerging areas in the field of geosynthetics, within the designated timeframe.'

e) Composition:

i) Prof. K. Rajagopal (Convener)
ii) Dr. Anup Rakshit, ITTA, Mumbai
iii) Shri Shahrokh Bagli, Strata Geosystems (I) Pvt Ltd, Mumbai
iv) Shri Saurabh Vyas, Techfab India, Mumbai
v) Dr. Ratnakar Mahajan, Macaferri Environmental Solutions Pvt Ltd, Navi Mumbai
vi) Shri V. Ravikanth Reliance Industries Ltd, New Delhi
vii) Shri Ravikant Sharma, Geosynthetics Testing Services Pvt Ltd, Ahmedabad
viii) Dr. Prasanta Kumar Panda, BTRA, Mumbai
ix) RDSO, Lucknow
x) Prof. Dali Naidu, Indian Institute of Technology, Madras
xi) Prof. G V Rao, In personal capacity
xii) Shri Rajendra Ghadge, Garware Technical Fibres Ltd., Pune

The committee further decided that the suggestions/recommendations received from the working group shall be placed in the next committee meeting for discussions and decisions.

Item 6 COMMENTS ON INDIAN STANDARDS

6.1 The committee considered the comments received from SROL, Hyderabad (BIS) on IS 17483 (Part 1) : 2020 'Geosynthetics — Geocells — Specification (Part 1) Load Bearing Application' and IS 17483 (Part 2) : 2020 'Geosynthetics — Geocells — Specification (Part 2) Slope Erosion Protection Application' as given in Annex 9 to the Agenda.

After detailed deliberation, the committee decided as follows:

a) *For IS 17483 (Part 1) : 2020 'Geosynthetics — Geocells — Specification (Part 1) Load Bearing Application':* The committee noted that geocells endure rigorous conditions including high traffic loads and elevated axial loads, replicating the specified test conditions outlined in the test method for high-pressure oxidative induction time so the committee decided that requirements of standard oxidative induction time and high pressure oxidative induction time shall remain unchanged in their present form.

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

[*Page* 4, *Table* 1, *Sl Nos (xi) and (xii), See also* Amendment No. 2] — Substitute the following for existing:

Sl No.	**Characteristics**	**Requirement**	**Method of Test, Refer to**
xi)	Standard oxidative induction time, minutes, *Min* Or High pressure oxidative induction time, minutes, *Min*	100 400	ISO 11357-6 ASTM D 5885

The committee further decided that above amendment shall be issued in wide circulation for one month time period eliciting the technical comments from the stakeholders. BIS may carry out the editorial changes in the draft amendment, if required.

6.2 Comments on IS 18309 : 2023 Geosynthetics — Prefabricated Vertical Drains for Quick Consolidation for Very Soft Plastic Soil — Specification

The committee considered the recommendation of the panel constituted under the convenorship of Prof. Rajagopal K., Andhra University, Visakhapatnam, on the comments received from Tencate Geosynthetics, Gurgaon on IS 18309 : 2023 'Geosynthetics — Prefabricated Vertical Drains for Quick Consolidation for Very Soft Plastic Soil — Specification' along with the test reports as received from Techfab India, Mumbai as given in Annex 10 to the Agenda. The committee also considered the issue of measuring discharge capacity raised during the meeting.

After detailed deliberation, the committee decided that following experts will review the title of the standard and requirements for elongation at break, roll length, trapezoid tear strength (for filter fabric) along with their test reports and suggest for the suitable changes/modification required in the standard. The suggestion/recommendation as received, shall be placed in the next committee meeting for discussion and decision.

a) Smt. Dola Roychowdhury, International Geosynthetics Society, India Chapter, New Delhi
b) Shri Suraj Vedpathak, Strata Geosystems (I) Pvt Ltd, Mumbai
c) Shri Saurabh Vyas, Techfab India, Mumbai

The committee also decided to share the copies of standards IS 17179 : 2019 'Geotextiles and Geotextile-related Products — Determination of Water Flow Capacity in their Plane' and ISO 18325 : 2015 'Geosynthetics — Test method for the determination of water discharge capacity for prefabricated vertical drains' to the following experts for their study and suggesting the suitable test method for incorporating in the standard.

Item 7 REVIEW OF STANDARDS

The committee considered the list of standards due for review as given in Annex 10 to the Agenda. After deliberation, the committee decided that BIS shall fill the review proforma for the standards and circulate for 10 days.

a) In case of no comments received, the committee decided to reaffirm the standards from their due date.
b) In case of comment received, same shall be placed in next committee meeting for discussion and decision.

The committee further noted that IS 13325:1992 'Determination of tensile properties of extruded polymer geogrids using the wide strip — Test method' covers the test method for determining the tensile properties of extruded geogrids using a wide strip specimen. Since this method is already covered in IS 16635 'Geosynthetics — Wide-Width Tensile Test', the committee decided to recommend to TXDC for the withdrawal of IS 13325:1992.

Item 8 ANY OTHER BUSINESS

The committee considered the new work item on 'Fabric Form Concrete Mattress' as raised during the meeting for formulation of Indian Standard. After deliberation, the committee noted that the product is currently manufactured by limited manufacturers. In light of this, the committee decided that matter will be revisited in the future for formulation of Indian Standard aligned with industry need and practices.