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BUREAU OF INDIAN STANDARDS
(NEW DELHI)

MINUTES

29th MEETING OF GEO-SYNTHETICS SECTIONAL COMMITTEE, TXD 30

Date/Day	Time	Venue
20 July, 2023 (Thursday)	1100 h	Through Video Conferencing

ATTENDEES:

1.	**Dr. A. N. Desai (*Chairman*)**	**The South India Textile Research Association Council, Coimbatore**
2.	Smt. Deepali Plawat	Ahmedabad Textile Industry's Research Association, Ahmedabad
3.	Shri Aniket Bhute	Archoma India Pvt. Ltd., Thane
4.	Shri Satish Naik	Best Geotechnique Pvt. Ltd, Mumbai
5.	Smt. Sumy Sebastian	Central Coir Research Institute, Alappuzha
6.	Dr. Pankaj Gupta	Central Road Research Institute, New Delhi
7.	Dr. R. Chitra	Central Soil and Materials Research Station, New Delhi
8.	Shri C. R. Devraj	Charankattu Coir Mfg. Co. (P) Ltd, Kerala
9.	Dr. Swapan Ghosh	Department of Jute and Fibre Technology, Kolkata
10.	Shri Amitabh Prabhakar	Ganga Flood Control Commission, Patna
11.	Shri Rajendra Ghadge	Garware Technical Fibers Ltd, Pune
12.	Shri Ravikant Sharma	Geosynthetics Testing Services Private Limited, Ahmedabad
13.	Dr. Manik Bhowmik	ICAR-National Institute of Natural Fibre Engineering and Technology, Kolkata
14.	Dr. Sanjoy Debnath	-do-
15.	Dr. Debayan Bhattacharya	Indian Geotechnical Society, New Delhi
16.	Prof. Amit Prashant	Indian Institute of Technology, Gandhinagar
17.	Shri Mohan Krishna Kohli	-do-
18.	Prof. K. Rajagopal	Indian Institute of Technology, Madras
19.	Smt. Soumita Chowdhury	Indian Jute Industries Research Association, Kolkata
20.	Smt. Ruchita Gupta	Indian Technical Textile Association, Mumbai
21.	Dr. M. K. Talukdar	Kusumgar Corporates, Mumbai
22.	Dr. Anil Dixit	Landmark Material Testing and Research Laboratory

		Private Limited, Jaipur
23.	Dr. Ratnakar Mahajan	Maccaferri Environmental Solutions Private Limited, Navi Mumbai
24.	Smt. Minimol Korulla	-do-
25.	Shri M. Dutta	National Jute Board, Kolkata
26.	Shri Praveen Kumar	Premier Polyfilm Limited, Ghaziabad
27.	Shri Sanjay Kumar Awasthi	Research Designs and Standards Organization (RDSO), Lucknow
28.	Shri Santosh Kumar Ojha	-do-
29.	Shri V. Ravikanth	Reliance Industries Limited, New Delhi
30.	Shri Shahrokh Bagli	Strata Geosystems (I) Pvt Ltd, Mumbai
31.	Shri Suraj Vedpathak	-do-
32.	Shri Saurabh Vyas	Techfab (India) Industries Ltd., Mumbai
33.	Dr. Prasanta Panda	The Bombay Textile Research Association, Mumbai
34.	Smt. Ashwini Sudam	The Synthetic and Art Silk Mills Research Association, Mumbai
35.	Shri V. K. Patil	In Personal Capacity
36.	Shri P. K. Choudhury	In Personal Capacity
37.	Shri Jayant Nashikkar	In Personal Capacity

BIS DIRECTORATE GENERAL:

38.	Shri J. K. Gupta (Scientist E and Head, Textiles)	Bureau of Indian Standards, New Delhi
39.	Shri Himanshu Shukla (Scientist B & Member Secretary)	-do-
40.	Shri Abhishek Gupta (Executive Assistant)	-do-

Item 0 WELCOME AND INTRODUCTORY REMARK BY THE CHAIRMAN

0.1 Shri J K Gupta, Head, Textiles extended a warm welcome to the Chairman, all committee members, and invitees. He expressed his appreciation for the enthusiastic involvement of the members, describing TXD 30 as vibrant committee. 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 all the members and invitees present in the meeting. He expressed heartfelt gratitude and appreciation for the committee members' active involvement in committee works. He also appreciated the new initiatives undertaken by BIS for process reforms in the standardization activity of BIS. He also urged all the members for their continual efforts in

standardization work because of QCOs are getting implemented in the field of geosynthetics and new subject are identified under SNAP for future growth and development in the country.

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

Item 1 NEW INITIATIVES IN STANDARDIZATION

The committee noted Rolling Annual Action Plan for the year 2023-24, Annual calendar of Technical Committee meetings, Research Projects to be taken up, List of National and International events to be participated, Scientific journals and periodicals to be subscribed etc. as given in Annex 1 (a), Annex 1 (a), Annex 1 (b), Annex 1 (c), Annex 1 (d) and Annex 1 (e) to the Agenda**.**

A detailed presentation was also given on New Process Reforms for Effective Functioning of Standardization Activity to the committee members.

Regarding the scientific journals, the committee informed the following popular magazines/journals in the field of Geosynthetics which may be subscribed, it was also decided committee may also send the list of journals which needs to be subscribed by BIS:

a) Geotextiles and Geomembranes
b) International Journal of Geosynthetics and Ground Engineering

Item 2 CONFIRMATION OF THE MINUTES OF THE PREVIOUS MEETING

2.1 The committee considered the comment received from Shri Rajendra Ghadge, Garware Technical Fibers Ltd, Pune on the minutes of the 28th meeting of TXD 30 held on 17th November 2022 and circulated to members vide BIS DG letter No. TXD 30/A2.28 dated 13th December 2022 as given in **Annex 2** to the Agenda.

The committee decided that above comments are not for accuracy of recording of minutes and decided to confirm the minutes of last meeting without any change. Further the committee decided to consider the above comment separately.

Item 3 COMPOSITION AND SCOPE OF TXD 30

3.1 The committee reviewed the composition of TXD 30, in view of directions received from competent authority to reconstitute the committee having members who have served more than 5 years of their tenure in their personal capacity or from any private institutions, and decided to recommend to Textile Division Council for the withdrawal of nomination of following organizations:

a) Texel Industries Limited, Gandhinagar
b) Megaplast India Pvt Ltd, Daman

It was further decided to include the above industries in the BIS mailing list for circulation of draft documents for their comments.

3.2 The committee reviewed the present scope and composition of TXD 30 as given in **Annex 3** to the agenda and decided as under :

a) To recommend TXDC, the cooption of Andhra University, Visakhapatnam. Prof. K Rajagopal will represent as principal member, name of the alternate member will be informed.
b) Prof. Dalli Naidu Arnepalli will represent Indian Institute of Technology, Madras as principal member name of the alternate member will be informed.
c) Fresh nominations will be sought from DKTE Centre of Excellence in Nonwovens, Ichalkaranji

3.3 The committee also considered the co-option request received from Jeevan Ecotex Pvt. Ltd., Mumbai and Tensar Geosynthetics India Pvt Ltd., Mumbai as given in **Annex 4** to the Agenda.

After deliberations the committee did not agree to the co-option requests of above mentioned industries 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 industries in the BIS mailing list for circulation of draft documents for their comments.

Item 4 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 28th meeting of TXD 30 as given in **Annex 5** to the agenda.

Item 5 DRAFT STANDARDS/AMENDMENT FOR FINALIZATION

5.1 The committee considered following draft amendment as issued in wide circulation for two month for eliciting technical comments from stake holders vide our letter reference no.- TXD 30/21617 dated 27-12-2022 as given in **Annex 6** to the Agenda.

i) Amendment No. 1 to IS 16362 : 2020 Geosynthetics — Geotextiles used in subgrade stabilization in pavement structures — Specification (*first revision*) [Doc TXD 30 (21617)].

After detailed deliberations, the committee decided to finalize the amendment for publication as follows:

(*Page* 3, *Table* 1, *Notes*) — Insert the following new Note 5:

‘**5** For durability tests having a range of products identical except for mass per area, it is sufficient to subject only the product of lowest class of each construction type, each elongation category to the test. The results of the test may be applied for the other products in

the range, unless they have been tested separately. On the basis of serviceability and performance parameters, the order of the class will be Class 1> Class 2> Class 3'

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

Item 6 COMMENTS ON PUBLISHED INDIAN STANDARDS

6.1 The committee considered the comments received from Shri Saurabh Vyas, Techfab India, Mumbai, Shri Rajendra Ghadge, Garware Technical Fibers Ltd, Pune, Surat Branch Office (SUBO), BIS Central Marks Department-II, BIS on the following standards as given in **Annex 7** to the Agenda:

i) IS 16391 : 2015 Geosynthetics — Geotextiles used in sub-grade separation in pavement structures – Specification
ii) IS 16392 : 2015 Geosynthetics — Geotextiles for permanent erosion control in hard armor systems – Specification
iii) IS 16393 : 2015 Geosynthetics — Geotextiles used in subsurface drainage application — Specification
iv) IS 16090 : 2013 Geo-synthetics — Geo-textiles used as protection (or cushioning) materials – Specification
v) IS 16362 : 2020 Geosynthetics — Geotextiles used in subgrade stabilization in pavement structures — Specification (first revision)

After detailed deliberation, the committee decided as follows:

a) To issue an amendment to 'IS 16391 : 2015 Geosynthetics — Geotextiles used in sub-grade separation in pavement structures — Specification' incorporating the following changes:

i) (*Page* 2, *Clause* 4.2, *third sentence*) — Substitute the following for existing:

'Polyolefin material shall be made resistant to ultraviolet light by adding suitable UV stabilizers such as carbon black or UV masterbatch etc.'

ii) (*Page* 3, *Table* 1) — Substitute the following for existing Table:

Table 1 Requirements of Geotextiles for Separation Applications
(*Clauses* 1.2, 4.3 and 5.4)

Sl No.	**Characteristic(s)**	**Requirements**				**Method of Test, Ref to**
		Class I		Class II		
		Elongation < 50 percent	Elongation ≥ 50 percent	Elongation < 50 percent	Elongation ≥ 50 percent	

(1)	(2)	(3)	(4)	(5)	(6)	(7)
i	Index properties					
	a) Type of geotextile	Woven/non-woven		Woven/non-woven		-
	b) Roll length, m, *Min*	50 or 100 or as agreed		50 or 100 or as agreed		IS 1954
	c) Roll width, m, Min	2.0 or 5.0 or as agreed		2.0 or 5.0 or as agreed		IS 1954
	d) Grab strength, N, *Min*	1 100	700	800	500	IS 16342
	e) Sewn seam strength, N, *Min* (*see* Note 1)	990	630	720	450	IS 15060
	f) Trapezoidal tear strength, N, *Min*	400	250	300	180	IS 14293
	g) CBR puncture strength, N, *Min*	2250	1400	1700	1000	IS 16078
	h) Burst strength, kPa, *Min*	2 700	1 300	2 100	950	IS 1966 (Part 2)
ii	Structural integrity properties:					
	a) Permittivity, s^{-1} , *Min*	0.02	0.02	0.02	0.02	IS 14324
	b) Apparent opening size (AOS),mm, *Max*	0.60	0.60	0.60	0.60	IS 14294
iii	Durability properties:					
	a) Resistance to installation damage, Percent retained strength, SC/SW/GP (*see* Note 2), *Min*	95/93/90		95/93/90		IS 17420
	b) Ultraviolet stability at 500h, Retained strength, Percent of original strength, *Min*	70	70	70	70	IS 13162 (Part 2)

NOTES

1 The parameter shall be tested when product is supplied with seam. Refer to IS 16345 for stitch and overlap seam requirements.

2 Resistance to installation damage (loss of load capacity or structural integrity) when subjected to mechanical installation stress in clayey sand (SC), well graded sand (SW) and crushed stone classified as poorly graded gravel (GP).

3 Class 2 geotextiles may be specified for aggregate cover thickness of first lift over the geotextile exceeding 300 mm and aggregate diameter less than 50 mm or for aggregate cover thickness of first

lift over the geotextile exceeding 150 mm, aggregate diameter less than 30 mm and construction equipment contact pressure less than 550 kPa based on field experience, laboratory testing and visual inspection of a geotextile sample removed from a field test section **3** Permittivity and permeability of geotextile shall be greater than that of the soil. **4** For Class 1, the required MARV tear strength for woven monofilament geotextiles shall be 250 N.

iii) (*Page* 5, *Annex* A) — Substitute the following for the existing entries for IS 1966 (Part 2): 2009, IS 6359:1971, IS 13321 (Part 1): 1992, IS 15060 : 2001:

IS Number	*Title*
IS 6359 : 2023	Method for conditioning of textiles (*first revision*)
IS 1966 (Part 2) : 2022/ ISO 13938-2:2019	Textiles - Bursting properties of fabrics Part 2: Pneumatic method for determination of bursting strength and bursting distension (*third revision*)
IS 13321 (Part 1) : 2022/ ISO 10318-1:2015	Geosynthetics — (Part 1) : Terms and definitions
IS 15060 : 2018/ ISO 10321:2008	Geosynthetics – Tensile test for joint seams by wide-width strip method (*first revision*)

iv) (*Page* 5, *Annex* A) — Delete the entry for IS 16380 : 2015.

v) (*Page* 5, *Annex* A) —Insert the following new entry at the end:

IS No.	*Title*
IS 16345 : 2020	Geosynthetics – Guidelines for installation of geotextile used in subgrade separation in pavement structures (*first revision*)
IS 17420 : 2020	Geosynthetics – Index test procedure for the evaluation of mechanical damage under repeated loading – Damage caused by granular materials (Laboratory test method)

vi) (*Page* 7, *Annex* C) — Delete and renumber subsequent entries.

b) To issue an amendment to 'IS 16392 : 2015 Geosynthetics — Geotextiles for permanent erosion control in hard armor systems – Specification' incorporating the following changes:

i) (*Page* 1, *Clause* 4.2, *third sentence*) — Substitute the following for existing:

'Polyolefin material shall be made resistant to ultraviolet light by adding suitable UV stabilizers such as carbon black or UV masterbatch etc.'

ii) (*Page* 3, *Table* 1) — Substitute the following for existing Table:

Table 1 Requirements of Geotextiles for Permanent Erosion Control Applications

(*Clauses* 4.3 and 5.4)

Sl No.	Characteristic(s)	Requirements				Method of Test, Ref to
		Class I		Class II		
		Elongation < 50 percent	Elongation ≥ 50 percent	Elongation < 50 percent	Elongation ≥ 50 percent	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i	Index properties					
	a) Type of geotextile	Woven/non-woven		Woven/non-woven		-
	b) Roll length, m, *Min*	50 or 100 or as agreed		50 or 100 or as agreed		IS 1954
	c) Roll width, m, Min	5.0 or as agreed		5.0 or as agreed		IS 1954
	d) Grab strength, N, *Min*	1 400	900	1 100	-	IS 16342
	e) Sewn seam strength, N, *Min* (*see* Note 1)	1 200	810	990	-	IS 15060
	f) Trapezidal tear strength, N, *Min*	500	350	400	-	IS 14293
	g) Abrasion strength, Min (*see* Note 2)	550	400	350	-	IS 14714
	h) CBR puncture strength, N, *Min*	2250	1400	1700	-	IS 16078
	j) Burst strength, kPa, *Min*	3 500	1 700	2 700	-	IS 1966 (Part 2)
ii	Structural integrity properties: (*see* Note 3)					IS 1670
	a) Permitttivity, sec^{-1} , *Min*					IS 14324
	1) For course soil	0.7		0.7		
	2) For medium soil	0.2		0.2		
	3) For fine soil	0.1		0.1		
	b) Apparent opening size (AOS), mm, *Max*					IS 14294
	1) For course soil	0.43		0.43		IS 13162 (Part 2)
	2) For medium soil	0.25		0.25		

	3) For fine soil	0.22	0.22	
iii)	Durability properties:			
	a) Resistance to installation damage, Percent retained Strength, SC/SW/GP (*see* Note 4), *Min*	95/93/90	95/93/90	IS 17420
	b) Ultraviolet stability at 500h, retained strength, percent of original strength, *Min*	70	70	IS 13162 (Part 2)

NOTES

1 The parameter shall be tested when product is supplied with seam. Refer to IS 16344 for stitch and overlap seam requirements.

2 After abrading the geotextiles for 250 cycles, the grab strength shall be calculated by the method specified in IS 16342.

3 The structural integrity properties of geotextile is affected by the in-situ soil gradation. Geotextile fabric selection is determined by the presence of coarse, medium, or fine soil particles at the installation site. Soil classification into these categories is based on the percentage of particles passing through a 0.075 mm (200 mesh) sieve:

a) Course soil: In situ soil passing <15 percent
b) Medium soil: In situ soil passing 15 to 50 percent
c) Fine soil: In situ soil passing >50 percent

4 Resistance to installation damage (loss of load capacity or structural integrity) when subjected to mechanical installation stress in clayey sand (SC), well graded sand (SW) and crushed stone classified as poorly graded gravel (GP).

5 Class 2 geotextile may be specified if these have sufficient survivability based on field experience, laboratory testing and visual inspection of a geotextile sample removed from a field test section constructed under anticipated field conditions or if,

a) armor layer stone weights exceed 100 kg, stone drop height is less than 1 m and the geotextile is protected by a 150 mm thick aggregate bedding layer designed to be compatible with the armor layer.

b) armor layer stone weights do not exceed 100 kg and stone is placed with a zero drop height.

6 Permittivity and permeability of geotextile shall be greater than that of the soil.

7 For Class 2, the required MARV tear strength for woven monofilament geotextile shall be 250 N

iii) (*Page* 5, *Annex* A) — Substitute the following for the existing entries for IS 1966 (Part 2): 2009, IS 6359:1971, IS 13321 (Part 1): 1992, IS 15060 : 2001:

IS Number	*Title*
IS 6359 : 2023	Method for conditioning of textiles (*first revision*)
IS 1966 (Part 2) : 2022 / ISO 13938-2:2019	Textiles — Bursting properties of fabrics Part 2: Pneumatic method for determination of bursting strength and bursting distension (*third revision*)
IS 13321 (Part 1) : 2022/ ISO 10318-1:2015	Geosynthetics — (Part 1) : Terms and definitions
IS 15060 : 2018 / ISO 10321:2008	Geosynthetics — Tensile test for joint seams by wide-width strip method (*first revision*)

iv) (*Page* 5, *Annex* A) — Delete the entry for IS 16380 : 2015.

v) (*Page* 5, *Annex* A) —Insert the following new entry at the end:

IS No.	*Title*
IS 16344 : 2015	Geosynthetics — Guidelines for installation of geotextile for permanent erosion control in hard armor systems
IS 17420 : 2020	Geosynthetics – Index test procedure for the evaluation of mechanical damage under repeated loading – Damage caused by granular materials (Laboratory test method)

vi) (*Page* 7, *Annex* C) — Delete and renumber subsequent entries.

c) To issue an amendment to 'IS 16393 : 2015 Geosynthetics - Geotextiles used in subsurface drainage application - Specification' incorporating the following changes:

i) (*Page* 1, *clause* 4.2, *third sentence*) —Insert the following after second sentence:

'Polyolefin material shall be made resistant to ultraviolet light by adding suitable UV stabilizers such as carbon black or UV masterbatch etc.'

ii) (*Page* 3, *Table* 1) — Substitute the following for existing Table:

Table 1 Requirements of Geotextiles for Subsurface Drainage Applications

(*Clauses* 4.3 and 5.4)

Sl No.	**Characteristic(s)**	**Requirements**				**Method of Test, Ref to**
		Class I		Class II		
		Elongation < 50	Elongation ≥ 50	Elongation < 50	Elongation ≥ 50	

		percent	percent	percent	percent	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
A	**Index properties**					
	i) Type of geotextile	Woven/non-woven		Woven/non-woven		-
	ii) Roll length, m, *Min*	50 or 100 or as agreed		50 or 100 or as agreed		IS 1954
	iii) Roll width, m, Min	2.0 or 5.0 or as agreed		2.0 or 5.0 or as agreed		IS 1954
	iv) Grab strength, N, *Min*	1 100	700	800	500	IS 16342
	v) Sewn seam strength, N, *Min* (*see* Note 1)	990	630	720	450	IS 15060
	vi) Trapezoidal tear strength, N, *Min*	400	250	300	180	IS 14293
	vii) CBR puncture strength, N, *Min*	2250	1400	1700	1000	IS 16078
	vii) Burst strength, kPa, *Min*	2 700	1 300	2 100	950	IS 1966 (Part 2)
B	**Structural integrity properties:** (*see* Note 2)					IS 1670
	a) Permitttivity, sec^{-1} , *Min*					IS 14324
	1) For course soil	0.5		0.5		
	2) For medium soil	0.2		0.2		
	3) For fine soil	0.1		0.1		
	b) Apparent opening size (AOS), mm, *Max*					IS 14294
	1) For course soil	0.43		0.43		
	2) For medium soil	0.25		0.25		
	3) For fine soil	0.22		0.22		
C	**Durability Properties**					
	i) Resistance to installation damage, percent retained strength, SC/SW/GP (*see* Note 3), *Min*	95/93/90		95/93/90		IS 17420
	ii) Ultraviolet stability at 500 h, retained strength, percent of original	70	70	70	70	IS 13162 (Part 2)

	strength, Min					

NOTES

1 The parameter shall be tested, when product is supplied with seam. Refer to IS 16363 for stitch and overlap seam requirements.

2 The structural integrity properties of geotextile is affected by the in-situ soil gradation. Geotextile fabric selection is determined by the presence of coarse, medium, or fine soil particles at the installation site. Soil classification into these categories is based on the percentage of particles passing through a 0.075 mm (200 mesh) sieve:

a) Course soil: In situ soil passing <15 percent
b) Medium soil: In situ soil passing 15 to 50 percent
c) Fine soil: In situ soil passing >50 percent

3 Resistance to installation damage (loss of load capacity or structural integrity) when subjected to mechanical installation stress in clayey sand (SC), well graded sand (SW) and crushed stone classified as poorly graded gravel (GP).

4 Class 2 geotextile may be specified for trench drain application based on field experience, laboratory testing and visual inspection of a geotextile sample removed from a field test section or when the subsurface drain depth is less than 2 m and drain aggregate is less than 30 mm.

5 In addition to the above default filtration property value of permittivity and AOS, site specific geotextile design may be performed if one or more of the following problematic soil environment is encountered: unstable or highly erodible soils such as non-cohesive silts, gap graded soils, alternating sand/silt laminated soils, dispersive clays and/or rock flour

iii) (*Page* 5, *Annex* A) — Substitute the following for the existing entries for IS 1966 (Part 2): 2009, IS 6359:1971, IS 13321 (Part 1): 1992, IS 15060 : 2001:

IS Number	*Title*
IS 1966 (Part 2) : 2022/ ISO 13938-2:2019	Textiles — Bursting properties of fabrics Part 2: Pneumatic method for determination of bursting strength and bursting distension (*third revision*)
IS 6359 : 2023	Method for conditioning of textiles (*first revision*)
IS 13321 (Part 1) : 2022/ ISO 10318-1:2015	Geosynthetics — (Part 1) : Terms and definitions
IS 15060 : 2018 / ISO 10321:2008	Geosynthetics — Tensile test for joint seams by wide-width strip method (*first revision*)

iv) (*Page* 5, *Annex* A) — Delete the entry for IS 16380 : 2015.

v) (*Page* 5, *Annex* A) —Insert the following new entry at the end:

IS No.	*Title*
IS 16363 : 2015	Geosynthetics — Guidelines for installation of geotextile used in subsurface drainage application
IS 17420 : 2020	Geosynthetics — Index test procedure for the evaluation of mechanical damage under repeated loading – Damage caused by granular materials (Laboratory test method)

vi) (*Page* 8, *Annex* C) — Delete and renumber subsequent entries.

d) To issue an amendment to 'IS 16362 : 2020 Geosynthetics – Geotextiles used in subgrade stabilization in pavement structures – Specification (*first revision*)' incorporating the following changes:

i) (*Page* 2, *Clause* 4.2, *third sentence*) —Substitute the following for third sentence:

'Polyolefin material shall be made resistant to ultraviolet light by adding suitable UV stabilizers such as carbon black or UV masterbatch etc.'

ii) (*Page* 3, *Table* 1) — Substitute the following for existing Table:

Table 1 Requirements of Geotextiles for Stabilization Applications

(*Clauses* 4.3 and 5.4)

Sl No.	**Characteristic(s)**	**Requirements**						**Method of Test, Ref to**
		Class I		Class II		Class III		
		Elongation < 50 percent	Elongation ≥ 50 percent	Elongation < 50 percent	Elongation ≥ 50 percent	Elongation < 50 percent	Elongation ≥ 50 percent	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
A	**Index properties**							
	i) Type of geotextile	Woven/non-woven		Woven/non-woven		Woven/non-woven		-
	ii) Roll length, m, *Min*	50 or 100 or as agreed		50 or 100 or as agreed		50 or 100 or as agreed		IS 1954
	iii) Roll width, m, Min	2.0 or 5.0 or as agreed		2.0 or 5.0 or as agreed		2.0 or 5.0 or as agreed		IS 1954
	iv) Grab strength, N, *Min*	1 400	900	1 100	700	800	500	IS 16342

	v) Sewn seam strength, N, *Min* (*see* Note 1)	1 200	810	990	630	720	450	IS 15060
	vi)Trapezoidal tear strength, N, *Min*	500	350	400	250	300	180	IS 14293
	vii) CBR puncture strength, N, *Min*	2 800	2 000	2 200	1 400	1 700	1 000	IS 16078
B	**Structural integrity properties:**							
	a) Permitttivity, s^{-1}, *Min*	0.05	0.05	0.05	0.05	0.05	0.05	IS 14324
	b) Apparent opening size (AOS),mm, *Max*	0.43	0.43	0.43	0.43	0.43	0.43	IS 14294
C	**Durability properties:**							
	i) Resistance to installation damage, percent retained strength, SC/SW/GP (*see* Note 2), *Min*	95/93/90		95/93/90		95/93/90		IS 17420
	ii) Ultraviolet stability at 500 h, retained strength, percent of original strength, Min	70	70	70	70	70	70	IS 13162 (Part 2)

NOTES:

1 The parameter shall be tested, when product is supplied with seam. Refer to IS 16355 for stitch and overlap seam requirements.

2 Resistance to installation damage (loss of load capacity or structural integrity) when subjected to mechanical installation stress in clayey sand (SC), well graded sand (SW) and crushed stone classified as poorly graded gravel (GP).

3 Class 2 or Class 3 geotextile may be specified in view of the sufficient survivability based on field experience, laboratory testing and visual inspection of a geotextile sample removed from a field test section.

4 Permittivity and permeability of geotextile should be greater than that of the soil.

5 For Class 2, the required MARV tear strength for woven monofilament geotextiles shall be

250 N.

iii) (*Page* 5, *Annex* A) — Substitute the following for the existing entry for 13321 (Part 1): 1992:

IS Number	*Title*
IS 13321 (Part 1) : 2022/ ISO 10318-1:2015	Geosynthetics — (Part 1) : Terms and definitions

v) (*Page* 5, *Annex* A) —Insert the following new entry at the end:

IS No.	*Title*
IS 16355 : 2015	Geosynthetics — Guidelines for installation of geogrids used as soil reinforcement in mechanically stabilised earth (MSE) retaining structures
IS 17420 : 2020	Geosynthetics — Index test procedure for the evaluation of mechanical damage under repeated loading – Damage caused by granular materials (Laboratory test method)

e) To issue an amendment to 'IS 16090 : 2013 Geo-synthetics – Geo-textiles used as protection (or cushioning) materials – Specification' incorporating the following changes:

(*Page* 2, *Clause* 4.3, *third sentence*) —Substitute the following for third sentence:

'Polyolefin material shall be made resistant to ultraviolet light by adding suitable UV stabilizers such as carbon black or UV masterbatch etc.'

f) The committee further decided that as the matter is urgent and non-controversial, the wide circulation of the above amendments mentioned at Sl. No. (a), (b), (c), (d) and (e) 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. BIS may carry out the editorial changes in the draft amendments if required.

g) The committee decided to take 'IS 16090 : 2013 Geo-synthetics – Geo-textiles used as protection (or cushioning) materials – Specification' for revision based on the latest technical development.

h) The committee constituted a panel under the convenorship of Dr. Swapan Ghosh, Department of Jute and Fibre Technology, Kolkata with the following composition to deliberate on amalgamation of the standards IS 16391 : 2015, IS 16392 : 2015, IS 16393 : 2015, IS 16362 : 2020 and IS 15910 : 2010 into a single standard:

i) Dr. Swapan Ghosh, Department of Jute and Fibre Technology, Kolkata (Convenor)
ii) Techfab India, Mumbai
iii) Macaferri Environmental Solutions Pvt. Ltd. Navi Mumbai
iv) BTRA, Mumbai
v) RDSO, Lucknow
vi) NHAI, Ghaziabad
vii) Panel may co-opt other members, if required.

6.2 The committee considered the comments received from Tensar Geosynthetics India Pvt Ltd., Mumbai and Dr. Ratnakar Mahajan, Macaferri Environmental Solutions Pvt Ltd, Navi Mumbai on following standards as given in **Annex 8** to the Agenda.

i) IS 17371 : 2020 Geosynthetics – Geogrids for flexible pavements – Specification
ii) IS 17373 : 2020 Geosynthetics – Geogrids used in reinforced soil retaining structures – Specification

After detailed deliberation, the committee decided as follows:

a) To issue an amendment to 'IS 17373: 2020 Geosynthetics – Geogrids used in reinforced soil retaining structures – Specification' incorporating the following changes:

(Page 2, clause 4) — Substitute the following for existing:

'**4 TYPES OF GEOGRIDS**

Geogrids shall be of the following three types based on the tensile strength and aperture size:

a) Type 1 — Polyester knitted or woven geogrids having tensile strength in machine direction up to 400 kN/m with aperture size in machine direction and cross machine direction from 10 to 50 mm.

b) Type 2 — Polyester bonded geogrids having tensile strength in machine direction upto 200 kN/m with aperture size in machine direction from 50 to 1000 mm and cross machine direction from 10 to 150 mm.

c) Type 3 — Polyester bonded geogrids having tensile strength in machine direction up to 1 300 kN/m with aperture size in machine direction from 50 to 1 000 mm and cross machine direction from 50 to 200 mm.'

The committee further decided that as the matter is urgent and non-controversial, the wide circulation of the above mentioned amendment be waived off under Rule 22 (4) of BIS Rules 2018 notified vide GSR 584(E) dated 25 June 2018; and draft amendment be held to has been

FINALIZED for publication. BIS may carry out the editorial changes in the draft amendment if required.

b) Dr. Ratnakar Mahajan, Macaferri Environmental Solutions Pvt. Ltd. Navi Mumbai will provide the test results/test data for roll width of flexible geogrids and applicable tolerances which shall be placed in the next committee meeting for discussion/deliberation.

6.3 The committee considered the comment received from Guwahati Branch Office (GHBO) after manak manthan on 'IS 16654 : 2017 Geosynthetics — Polypropylene multifilament woven geobags for coastal and waterways protection – Specification' as given in **Annex 9** to the Agenda. After deliberation the committee did not agree with the comment as the polystyrene geobag are not a widely recognized or commonly used in geotechnical applications.

6.4 The committee considered the comments received on Indian Standard on 'Geosynthetics — Reinforced Soil Structures — Code of Practice' from Dr. Anand Katti, Emeritus Professor, Datta Meghe College of Engineering, Mumbai and G R Infra projects Ltd., Gurugram and Tensar Geosynthetics India Pvt Ltd., Mumbai as given in **Annex 10** to the Agenda. After detailed deliberation, the committee decided to refer the comments the expert panel constituted under the convenorship of Dr. G. V. Rao for discussion/deliberation and for suggesting suitable amendments/changes to be incorporated in standard.

7. Revision of 'IS 14986 : Guidelines for Application of Jute Geotextile for Rain Water Erosion Control in Road and Railway Embankments and Hill Slopes'

The committee noted and scrutinized the test results received from IJIRA, Kolkata for Open Weave JGT as per '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 detailed deliberation, the committee noted that test result reported for tensile strength and elongation is not tested as per 'IS 16635 : 2017 Wide width tensile test' and decided that the IJIRA will conduct research project to test fresh samples provided by IJMA, Kolkata for generating empirical test data and will share the test result for all parameters specified in IS 14986, which shall be placed in the next meeting for discussion/deliberation.

Item 8 REVIEW OF STANDARDS

8.1 The committee considered the list of standards due for review as given in **Annex 12** to the agenda. After detailed deliberations, the committee decided as mentioned in the following Table:

Sl. No	IS Number	IS Title	Decision of the committee
1	IS 13325 : 1992	Determination of tensile properties of extruded polymer geogrtds using the wide strip — Test method	Decided as under **8.2**
2	IS 13326 (Part 1) : 1992	Evaluation of interface friction between geosynthetics and soil method of test: Part 1 modified direct shear technique	-do-
3	IS 14293 : 1995	Geotextiles — Method of test for trapezoid tearing strength	-do-
4	IS 14294 : 1995	Geotextiles — Method for determination of apparent opening size by dry sieving technique	-do-
5	IS 14324 : 1995	Geotextiles — Methods of test for determination of water permeability — Permittivity	-do-
6	IS 14706 : 1999	Geotextiles — Sampling and preparation of test specimens	-do-
7	IS 14714 : 1999	Geotextiles — Determination of abrasion resistance	-do-
10	IS 15910 : 2010	Geosynthetics for highways — Specification	Decided as under **6.1**
8	IS 15060 : 2018/ISO 10321:2008	Geosynthetics — Tensile test for joint seams by wide-width strip method (first revision)	To fill the review proforma and circulate for 7 days. Reaffirm the standard in case of no comment received.
9	IS 15871 : 2009	Use of coir geotextiles (Coir BHOOVASTRA) in unpaved roads — Guidelines	-do-
11	IS 16237 : 2014	Geo-synthetics — Method for determination of apparent opening size by wet sieving	-do-
12	IS 17179 : 2019/ISO 12958 : 2010	Geotextiles and geotextile-related products — Determination of water flow capacity in their plane	-do-

8.2 The committee considered the list of Pre-2000 standards as given in **Annex 13** to the agenda.

After detailed deliberations, the committee decided that these selected pre-2000 documents/standards of BIS need to be reviewed thoroughly by the experts of relevant field in today's context , to suggest suitable modification/changes in the text within 15 days.

To complete this task, it was decided that few (3-5) standards be allotted to each expert of relevant field and soft copies (preferably in word format for ease in incorporation of changes) will be provided by BIS to them. The list of experts to review the aforementioned standards are as follows:

Sl. No.	**IS Number**	**Title**	**To be reviewed by/Allocated to**
1	IS 13325 : 1992	Determination of tensile properties of extruded polymer geogrtds using the wide strip - Test method	BTRA, Mumbai
2	IS 13326 : Part 1 : 1992	Evaluation of interface friction between geosynthetics and soil method of test: Part 1 modified direct shear technique	-do-
3	IS 14293 : 1995	Geotextiles - Method of test for trapezoid tearing strength	-do-
4	IS 14294 : 1995	Geotextiles - Method for determination of apparent opening size by dry sieving technique	Landmark Material Testing and Research Laboratory Private Limited, Jaipur
5	IS 14324 : 1995	Geotextiles – Methods of test for determination of water permeability – Permittivity	-do-
6	IS 14706 : 1999	Geotextiles - Sampling and preparation of test specimens	-do-
7	IS 14714 : 1999	Geotextiles - Determination of abrasion resistance	Geosynthetics Testing Services Private Limited, Ahmedabad
8	IS 13162 : Part 2 : 1991	Geotextiles – Methods of test Part 2 Determination of resistance to exposure of ultraviolet light and water (Xenon-arc type apparatus)	-do-
9	IS 13162 : Part 4 : 1992	Geotextiles – Methods of test Part 4 Determination of puncture resistance by falling cone method	-do-

The committee also decided that the based on the technical inputs as received from the committee members, revised draft will be prepared and circulated to all committee members for 15 days time period for sharing comments. Comments along with the revised draft will be placed before the committee during its next meeting

Item 9 ANY OTHER BUSINESS

9.1 The committee noted the additional comments received from Shri Rajendra Ghadge, Garware Technical Fibers Ltd, Pune as given in **Annex 2** to the Agenda. After deliberations the committee decided to reconstitute the panel constituted for New Work Items Identified under SNAP 2022-27 and decided the composition of the panel shall be as follows:

a) Prof. K. Rajagopal (Convener)
b) Shri Shahrokh Bagli, Strata Geosystems (I) Pvt Ltd, Mumbai
c) Shri Saurabh Vyas, Techfab India, Mumbai
d) Dr. Ratnakar Mahajan, Macaferri Environmental Solutions Pvt Ltd, Navi Mumbai
e) Shri V. Ravikanth Reliance Industries Ltd, New Delhi
f) Shri Ravikant Sharma, Geosynthetics Testing Services Pvt Ltd, Ahmedabad
g) Dr. Anup Rakshit, ITTA, Mumbai
h) Shri Rajendra Ghadge, Garware Technical Fibers Ltd, Pune
i) BTRA, Mumbai
j) 2-3 users of above products.

9.2 The committee was also briefed about Awards initiatives by BIS for three categories i.e. 'Committee of the year award', 'Letter of appreciation to committee members' and 'Certificate of Excellence to committee members' for recognition of contributions of technical committees and its members.

Chairman and members were requested to nominate active members of this committee under the above mentioned categories for recognition of their valuable contributions.

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