

COE on Geotech**Lead : Bombay Textile Research Association (BTRA)****Updation Details as on Nov 2012****Chapter No. & Name: 2. Snapshot of COEs****Revised Page No. 7****Following is to added as last para in existing section "COE on Geotextiles"****COE on Geotextiles**

BTRA is going to set up a separate testing laboratory for soil, aggregates & asphalt.

COE on Geotech**Lead : Bombay Textile Research Association (BTRA)****Updation Details as on Nov 2012****Chapter No. & Name: 4. COE on Geotech****Revised Page No. 32****Following "Testing Equipment" are to be added under Infrastructure facilities****Infrastructure facilities**

Testing equipment (procured under COE):

Sr. No	Name Of Equipment	Model/type/ year of make	Range & Accuracy
1.	Universal Testing Machine	H300KU Tinius Olsen 2008	300KN 1%
2.	Peel Bond Tester	1kN Tinius Olsen 2008	1 KN 1%
3.	Melt Flow Indexer	AC type Stop watch LSW-72 International Equipments	Temp. up to 400 oC ± 0.1 oC
4	ESCR	Controller -VT 4826 International Equipments	Temp. 100 oC ± 0.1 oC
5	Carbon Black Content Tester	Controller -VT 4826 International Equipments	Temp.up to 1000oC Rotameter 2.0 LPM
6.	Porometer	Quantachrome, 3Gz, USA	1 to 250 microns ± 0.01 micron
7	Particle Size Analyser	Malvern Master Sizer 2000	0.02 to 2000 microns ± 0.01 micron
8	Water Vapour Transmission Rate Tester	TextTest FX 3150 Gravitest	Air flow ± 0.01 m/sec Weight ± 0.1 mg Humidity ± 0.1 % Temp ± 0.1 oC
9	CBR Puncture Test Apparatus	Aimil	Max. stroke 150mm
10	Index Puncture Test Apparatus (Pneumatic)	Tinius Olsen	Max. stroke 50mm
11	Air permeability Tester	Qualitest-Frazier	Up to 500 LPM
12	Thermal Conductivity Tester	Laser Comp	Product up to 100 mm max
13	Pneumatic press (with cutting dies)	Pneumatic Dumbell Cutter	Capacity 1 Ton
14	UV Weatherometer	Q-Sun	--

COE on Geotech**Lead : Bombay Textile Research Association (BTRA)**

15	Profile Projector	Sipcon / SVI-IMG MSU 3D	30 x to 200x
16	Hydrostatic pressure head tester	Mesdan	Water head up to 100cm
17	Upgradation of DSC	HP	Up to 1000oC
18	Martindale Abrasion tester	James & Heals	--
19	Stress Cracking Resistance Tester	WIRA	Temp 50 & 100 oC ± 0.1oC
20	Pyramid Puncture Tester	Tinius Olsen	Capacity 5 Ton
21	Dry powder analyser	Malvern	0.02 to 2000 micron
22	Filtration efficiency tester	--	--
23	Hydraulic transmissivity tester	BT Technology	--
24	Soil Geotextile Clogging potential Tester	BT Technology	-

Test equipment expected (under COE):

25	Water permeability under load		
26	Vertical strip drain tester in crimped condition		
27	Filtration efficiency tester		
28	Multi axial tension tester		

Additional Test equipment for Geosynthetic testing (Procured by BTRA):

1.	Instron	4206	50kN ±1 %
2.	Cone Drop Tester	BTRA	2 to 50 mm ± 2 mm
3.	BTRA Thickness Tester	BTRA	10 mm ± 0.01 mm
4.	Water Permeability Tester	BTRA	Flow rate 1 to 30 LPM ±0.1 LPM WH up to 100 mm
5.	Digital Density Balance	ER200A Afcoset	up to 100 g ± 0.0001 g density from 0.88 to 22 g/cc
6.	Digital Bursting Strength Tester	Qualitest QC115D	Up to 60kg/cm ² ± 0.1kg/cm ²
7.	SDL Thickness Tester	SDL Carpet thickness gauge	Thick 0 to 25 mm ±0.01mm Pressure 2 to 200kPa
8.	Index Puncture Test	BTRA	Max. stroke 50mm

COE on Geotech**Lead : Bombay Textile Research Association (BTRA)**

	Apparatus (mechanical)		
9.	Digital Platform Scale	CS 100 CITIZEN	Up to 100 kg \pm 20 g
10	Sieve Shaker	C. Abhaykumar	--

COE on Geotech

Lead : Bombay Textile Research Association (BTRA)

Updation Details as on Nov 2012

Chapter No. & Name: 4. COE on Geotech

Revised Page No. 33

Following equipment "Water Vapour Transmission Rate Tester and its photo" is to be added in "Images: Geotech COE Equipment at BTRA"

Water Vapour Transmission Rate Tester



COE on Geotech**Lead : Bombay Textile Research Association (BTRA)****Updation Details as on Nov 2012****Chapter No. & Name: 4. COE on Geotech****Revised Page No. 34****Existing "Geotech Test Parameters Supported and Corresponding Cost" is to be replaced with following****Geotech Test Parameters Supported and Corresponding Cost**

Accreditation as per ISO 17025

- International : BTRA Testing Lab is accredited by GRI, USA
- National : BTRA Testing Lab is accredited by NABL

Products tested at BTRA

- GEOTEXTILES
- GEOCELL
- GEONETS
- GEOGRIDS (Geogrid, Geomat, Geostrap)
- GEOMEMBRANES (Smooth & Texturized)
- GEOCOMPOSITES
- Geosynthetic Clay Liner (GCL)
- GABIONS (Metal & Rope)
- Turf Reinforcement Mats (TRM)
- DRAINS
 - :Prefabricated Vertical Drains (PVD)
 - :Geodrain

COE on Geotech

Lead : Bombay Textile Research Association (BTRA)

Update Details as on Nov 2012

Chapter No. & Name: 4. COE on Geotech

Revised Page No. 35

Existing Table of "Test Parameters" are to be replaced with following Table

Geotech Test Parameters Supported and Corresponding Cost

Test Parameters

	Test Parameters	ASTM	ISO	IS	BS EN	quantity	Rs.
1	AOS	D 4751		14294		2 M ²	600
2	Abrasion	D 4886		14714		0.5 M ²	4000
3	Bursting strength	D 3786				0.5 M ²	350
4	CBR puncture	D 6241	12236			2 M ²	1250
5	Carbon Black Content	D 1603				1 sq.ft	1200
6	Cone Drop		13433	13162-4	918	2 M ²	400
7	Density	D 792				1 sq.ft	500
8	ESCR	D 1693				1 sq.ft	1200
9	Grab Strength	D 4632	13934-2			1 M ²	1000
10	Index Puncture	D 4833				0.75 M ²	1200
11	Mass	D 5261	9864	14716		0.5 M ²	500
12	Melt flow index	D 1238				10 gm	900
13	Pore Size	D 6767				0.5 M ²	1250
14	Rope Strength			7071-4	1140	6 M	900
15	Seam strength	D 4884	10321	15060		2 M ²	1500
16	Tear Strength of geomembrane	D 1004				0.5 M ²	1200
17	Tensile strength 50mm strip	D 5035	13934-1	1969		0.5 M ²	900
18	Tensile strength of geogrid-single rib	D 6637 A				3 M ²	1000
20	Tensile strength of geogrid-multi rib	D 6637 B				3 M ²	2000
21	Tensile strength of geomembrane	D 6693				0.5 M ²	1200
22	Thickness	D 5199	9863-2	13162-3		0.5 M ²	250
23	Trapezoid tear strength	D 4533		14293		1 M ²	1000
24	UV stabilization	D 4355		13162-2	12225	1 M ²	80/hr

COE on Geotech

Lead : Bombay Textile Research Association (BTRA)

25	Water permeability	D 4491	11058	14324	6906-3	0.75 M ²	1800
26	2% secant modulus of geomembrane	D 5323				0.5 M ²	1200
27	Metal Gabion (size, thickness, tensile)	D 975				1 piece	1700
28	Wide width of geotextile	D 4595	10319	13162-5		2 M ²	1500
29	Wide width of geomembrane	D 4885				2 M ²	1500
30	pyramid puncture resistance	D 5494				2 M ²	2000
31	Thermal Conductivity	C 518		3144		1 M ²	2000
32	Weld strength of geomembrane	BTRA dev.	-	-	-	1m	2000
33	Horizontal pull out test	D 6706				3M ²	5000
34	Stress cracking resistance	D 5397				0.5 M ²	2000
35	Hydraulic transmissivity	D 4716				1 M ²	2000
36	Soil geotextile clogging potential	D 5101				1 M ²	2000

COE on Geotech**Lead : Bombay Textile Research Association (BTRA)****Updation Details as on Nov 2012****Chapter No. & Name: 4. COE on Geotech****Revised Page No. 35****Change of the name of equipment given in Incubation Centre**

Name of the middle image given in Incubation Centre is to be changed to "WARPING MACHINE" from "~~Water Vapour Transmission Rate Tester (Warping Machine)~~"

COE on Geotech**Lead : Bombay Textile Research Association (BTRA)****Updation Details as on Nov 2012****Chapter No. & Name: 4. COE on Geotech****Revised Page No. 37****Existing "Technical Manpower" is to be replaced with following****Technical manpower**

Name of technical personnel & field of specialization:

1	Dr. A. N. Desai	Ph.D in nonwoven Field of specialization: nonwoven & technical textiles Experience: 31 years
2	Mr. Venkatrayan	MSc. Field of specialization : Consultancy in Lab Accreditation, Total Quality Management, Lead Assessor for NABL Audit. Over 35 years experience in all aspects of textile testing and Certification / accreditation & quality management .
3	Mr. V.K.Patil	LTM , VJTI Field of specialization: nonwoven & technical textiles, development of products, Development of test equipments, consultancy in nonwoven etc. No. of technical papers presented: 6 No.of publications : 32 Experience: 31 years No. of project handled : 8
4	Mr. Rajit Menon	B.Sc (Chemistry) Experience: 19 years in testing of technical textiles
5	Mr. G.R.Mahajan	LTM , VJTI Testing of geosynthetics Experience: 2 years in testing of technical textiles & Manufacturing 14 years

COE on Geotech**Lead : Bombay Textile Research Association (BTRA)****Update Details as on Nov 2012****Chapter No. & Name: 4. COE on Geotech****Revised Page No. 37****Existing "List Of Standards and Specifications Formulated" is to be replaced with following****List Of Standards and Specifications Formulated****Specifications finalized**

1. Specifications of geosynthetics for highways
 - 1.1 Geotextile for Reinforcement applications
 - 1.2 Geotextile for Separation purpose
 - 1.3 Geotextile for Filtration purpose
 - 1.4 Geotextile for drainage applications
2. Specifications of PVC geomembrane (IS 15909) for water proofing lining purpose for use in canal, ponds, reservoirs, industrial effluents & roofing
3. Specifications for coir bhoovastra (IS 15869)

Specifications under preparationDraft standard prepared

1. Specifications for geogrid used as soil reinforcement in mechanically stabilized earth (MSE) retaining structures
2. Specifications for geogrid used as reinforcement of base and sub-base layers in pavement structures
3. Specifications for geotextile used in pavement overlays
4. Specifications for geotextile used as protection (or cushioning) material

Revision

Jute geotextile-part 1 for strengthening of sub grade in road (IS 14715)

Part 2 for control of bank erosion in rivers & waterways (IS 14715)

Proposed draft for ;

1. Specifications for geotextile used in sub-surface drainage application
2. Specifications for geotextile for permanent erosion control in hard armor system
3. Specifications for geotextile used in sub-grade separation in pavement structures
4. Specifications for geotextile used in sub-grade stabilization in pavement structures

Test standards finalized :

COE on Geotech**Lead : Bombay Textile Research Association (BTRA)**

1. Determination of water permeability normal to the plane, without load
2. Determination of the characteristics opening size
3. Determination of water flow capacity in their plane
4. Static (CBR) puncture resistance
5. Apparent opening size by wet sieving

Test standards under review :

Test method for the determination of the filtration behaviour of geotextiles under turbulent water flow conditions

Geotextiles and Geotextile-related products- Determination of water permeability characteristics normal to the plane, under load

Draft standards formulated by COE & submitted to BIS

Sr. No.	Test method	Title / test
1	ASTM D 1987	Biological clogging of geotextile
2	ASTM D 4632	Grab breaking strength & elongation
3	ASTM D 4594	Effect of temperature on stability of geotextile
4	ASTM D 5322	Chemical resistance of geosynthetics to liquids
5	ASTM D 6706	Pull out resistance
6	ASTM D 5493	Permeability of Geotextile under Load
7	ASTM D 6574	Hydraulic Transmissivity
8	ASTM D 5970	Geotextile deterioration from out door exposure
9	ASTM D 6693	Tensile properties of geomembrane
10	ASTM D 4833	Index puncture
11	ASTM D 5397	Stress cracking resistance of Geomembrane using notched constant tensile load test
12	ASTM D 6767	Pore Size Characteristics of Geotextiles by Capillary Flow Test
13	ASTM D 5818	Installation Damage of Geosynthetics
14	ASTM D 6637	Tensile strength of geogrid
15	ASTM D 5747	Chemical Resistance of Geomembranes to Liquids
16	ASTM D5494	Pyramid Puncture Resistance of Geomembranes
17	ASTM D 5596	Dispersion of Carbon Black in Polyolefin Geosynthetics.
18	ASTM D 4885	Performance strength of Geomembrane by wide width tensile strength method
19	In house	Determination of Weld strength of Geocell
20	ASTM D 5323	Determination of 2 % Secant modulus for polyethylene geomembrane

COE on Geotech**Lead : Bombay Textile Research Association (BTRA)****Updation Details as on Nov 2012****Chapter No. & Name: 4. COE on Geotech****Revised Page No. 38****New section "List of manuals prepared" to be added****List of manuals prepared:**

1. Geotextile in Roads

COE on Geotech**Lead : Bombay Textile Research Association (BTRA)****Updation Details as on Nov 2012****Chapter No. & Name: 4. COE on Geotech****Revised Page No. 38****Existing "R & D Projects on Technical Textiles undertaken / under progress" is to be replaced with following****R & D Projects on Technical Textiles undertaken / under progress**

- i. Development of geotextile (natural & synthetic fibres) for various clients. (completed)
- ii. Development of Filters for various clients (completed).
- iii. Design & development of creep rupture tester as per ASTM D 5262 (completed).
- iv. Development of protective nonwoven (completed).
- v. Development of woven geotextile (under progress).

COE on Geotech**Lead : Bombay Textile Research Association (BTRA)****Updation Details as on Nov 2012****Chapter No. & Name: 4. COE on Geotech****Revised Page No. 38****Existing "Training programs offered by COE" is to be replaced with following****Training programs offered by COE**

Training in Nonwovens & Geosynthetics given to 70 persons so far.

Training modules :

- Technical Textiles
- Nonwovens
- Geosynthetics

COE on Geotech**Lead : Bombay Textile Research Association (BTRA)****Updation Details as on Nov 2012****Chapter No. & Name: 4. COE on Geotech****Revised Page No. 39****Existing "Foreign collaboration details " is to be replaced with following****Foreign collaboration details**

Collaborated with foreign Institutes / organisations:

- FITI (Testing Laboratory – GRI, USA accredited), South Korea
- GRI (Geosynthetic Research Institute), USA
- BTRA is a member of IGS (International Geosynthetic Society), USA
- BTRA is a member of EDANA, Europe
- BTRA is a member of INDA, USA
- BTRA is a member of AATCC, UK

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- Woven geotextile
- Other technical textiles Under progress