

TENDER SPECIFICATIONS
SAND-FILLED GEOTEXTILE MATTRESS

1. GENERAL

This work intends to supply the geotextile mattress (100mm to 250mm thick after sand filling) conforming to the material specifications stated herein, as per the bill of quantity and schedule of supplies enclosed.

The contractor shall furnish all labour, materials, equipment, and incidentals as shown, specified and required in connection with deployment, anchorage and filling of the geotextile mattress, in accordance with the lines, grades, design, and dimensions as required for the same.

2. MATERIAL PROPERTIES

2.1 General Requirements

The Geotextile Mattress system is a novel and sustainable protection measure that deals in the field of the river and coastal engineering. A geotextile mattress is a double-layered three-dimensional mattress used to form a protection system over the bed and slopes of a water channel. The upper and lower layers of the mattress should be manufactured from UV-stabilized high-strength woven fabric. Both layers of the mattress should be stitched together with the help of sewing threads by making several tubular pockets for sand filling.

2.2 Transportation, Storage and Handling

The geotextile mattress shall be delivered at the site in the form of rolls. All rolls shall have a protective cover with a label or tag specifying the name of the product, name of the manufacturer, roll number, roll dimension and date of manufacture.

Material shall be protected from sunlight, mud, dirt, debris, any other harmful substances or mechanical damage during transportation and storage. No hooks, tongs or other sharp instruments etc. should be used for handling geotextile mattress roll. The supplied geotextile mattress rolls should not be dragged along the ground and should be opened by removing the wrapper and laid down gently along the slope from top to bottom as per the guidelines. Adjacent geotextile mattress rolls shall be joined by

stitching at the site. Also, the geotextile mattress should not be exposed to temperatures over 60° C.

Any material, which is damaged during transportation, handling or storage and does not meet the minimum requirements of the specifications is liable for rejection by the engineer.

2.3 Quality Control and Testing

- Geotextile mattress should be resistant to chemicals and micro-organisms normally found in soils and stable within a pH range from 2 to 13 and resistant to short-term ultraviolet radiation.
- Geotextile mattress shall be Greenpro certified by the confederation of Indian Industry (CII).
- Geotextile fabric used to manufacture geotextile mattress should have high mechanical properties for enhanced durability along with enhanced puncture, abrasion and UV resistance.
- The thread for sewing must conform to the standard specification and be brought to the site in the manufacturer's original packing.
- The manufacturer shall have a manufacturing facility of PP staple fibre, nonwovens & geotextile mattress within one company. Also, the manufacturer shall be a woven fabric manufacturer.
- The manufacturer shall have ISO 9001:2015 certified quality systems along with in-house testing facilities and shall have NABL accredited ISO/IEC 17025:2017 in-house laboratory.
- The manufacturer shall submit CE Certification from one of the European agencies for nonwoven geotextile.
- The manufacturer shall issue a test report stating material properties, at the time of shipment made.
- The manufacturer is required to submit its previous supply record for the supply of geotextile mattress.
- The manufacturer is required to submit the balance sheet for the last three years showing no loss in the profit and loss statement.
- Manufacturer should have an in-house testing facility having testing provisions for test methods as mentioned below-

S.No	Standard No.	Title of Standard	Scope	Edition/ Year	Publication
1	ASTM D 4354-20	Sampling of geosynthetic	Testing procedure	2020	ASTM International
2	ASTM D-5261-18	Test Method for Measuring Mass per Unit Area of Geotextiles	Testing procedure	2018	
3	ASTM D-5199-19	Test Method for Measuring the Nominal Thickness of Geosynthetics	Testing procedure	2019	
4	ASTM D-4632-15	Test Method for Grab Breaking Load and Elongation of Geotextiles	Testing procedure	2015	
5	ASTM D-6241-14	Test Method for the Static Puncture Strength of Geotextiles and Geotextile-Related Products Using a 50-mm Probe	Testing procedure	2014	
6	ASTM D-4751-21a	Test Method for Determining Apparent Opening Size of a Geotextile	Testing procedure	2021	
7	ASTM D-4355-18	Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus	Testing procedure	2018	
8	ASTM D-4491M-22	Test Methods for Water Permeability of Geotextiles by Permittivity	Testing procedure	2022	
9	ASTM D-4533-15	Test Method for Trapezoid Tearing Strength of Geotextiles	Testing procedure	2015	
10	ASTM D-4595-17	Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method	Testing procedure	2017	
11	ASTM D 4716 -20	Determination of Flow capacity	Testing procedure	2020	
12	ASTM D-4833-07	Test Method for Index Puncture Resistance of Geomembranes and Related Products	Testing procedure	2007	
13	EN ISO-9864-05	Test Method for Measuring Mass per	Testing procedure	2005	EN ISO Publication
14	EN ISO-9863-1-16	Test Method for Measuring the Nominal Thickness of Geosynthetics	Testing procedure	2016	
15	EN ISO-10319-15	Geosynthetics Wide width Tensile Test	Testing procedure	2015	
16	EN ISO-12236-06	Static puncture Test (CBR)	Testing procedure	2006	
17	EN ISO-11058-19	Water Permeability of Geotextiles	Testing procedure	2019	
18	EN ISO 12956-10	Apparent Opening Size of a Geotextile	Testing procedure	2010	
19	EN ISO 12958	Determination of Flow capacity	Testing procedure	2010[E]	
20	EN ISO 13433-06	Cone Drop Test	Testing procedure	2006	
21	EN ISO 12224	Determination of the resistance to weathering	Testing procedure	2000	
22	ISO-17025:2017	General Requirements for Competence of Testing	For ISO	2017	

2.4 Physical Properties

Geotextile Mattress Technical Specifications

S. No.	Construction	Parameter	Test Method	Value
1	Lower layer	Material of Geotextile		PP Woven Fabric
		Weight of Geotextile	ASTM D-5261	≥400 gsm
		Tensile Strength (MD/CD)	ASTM D-4595	≥110 kN/m / ≥90 kN/m
		Tensile Elongation (MD/CD)	ASTM D-4595	≤ 25% / ≤25%
		AOS (Pore size)	ASTM D-6767/ ASTM D-4751	≤0.35 mm
		Abrasion resistance	BAW Drum Rotation	≥ 60%
		UV stability@500 hours	ASTM D-4355	≥90 %
		Resistance to oxidation	ENISO-13438@100° C for 28 days	≥80 %
2	Upper Layer	Material of Geotextile		Geocomposite Fabric (PP Woven black and green coloured nonwoven needle punched fabric)
		Weight of Geotextile	ASTM D-5261	≥650 gsm
		Tensile Strength (MD/CD)	ASTM D-4595	≥70.0 / ≥70.0 kN/m
		AOS (Pore size)	ASTM D-6767/ ASTM D-4751	≤0.35 mm
		Abrasion resistance	ASTM D-4886	≥35 %
		Resistance to oxidation (Strength Retained)	ISO/TR 13438@100°C of 28 days	≥80%
		UV stability@500 hours	ASTM D-4355	≥90 %
		3	Sewing thread of Geomattress	Tensile Strength
Tensile Elongation				≥20 %
4	Parallel Stitch	Stitch Position		35 Cms ± 2 Cms
		Stitch length (MD)		≤40 mm
5	Length	Roll Length		33 m

2.5 Infill Material

The fill material utilized to fill the geotextile mattress shall be locally available coarse sand. Loamy and clayey soil should be avoided as infill material. Geotextile mattress shall be filled mechanically or hydraulically up to the design thickness at the site and excess filling shall be checked. The tubular pockets of the geotextile mattress shall be filled from bottom to top.

3. INSTALLATION

3.1 Site Preparation

The site shall be prepared by clearing, grubbing, and excavating or filling the area to the design grade. This includes the removal of topsoil and vegetation. The backfill soil shall be well compacted and free from surface undulations before laying of mattress.

3.2 Laying of the mattress at the site

Geotextile mattress shall be laid along the profile of the slope from top to bottom to enable easy filling of the mattress on site. Adjacent rolls of mattresses shall be joined by seaming on site. During the filling process, the seams between the tubes should be under tension which helps to achieve the desired thickness of the mattress after filling.

4. APPROVED MANUFACTURERS

4.1 Approved Manufacturers

Techfab (India) Industries Ltd.
712, Embassy Centre,
Nariman Point, Mumbai – 400021
Phone: 022 – 2287 6224/6225
Fax: 022 – 2287 6218

5. DELIVERY

Delivery of Geotextile Mattress shall be done according to the delivery schedule.

6. PAYMENT

6.1 Method of Measurement

Geotextile mattress will be measured by the expanded square meter of material received at the customer's / contractor's store.

6.2 Basis of Payment

Payment for the supply of geotextile mattress shall be made at the contract unit price per expanded square meter, which shall be full compensation for the cost of materials, transportation, duties and taxes.