

## **TENDER SPECIFICATION**

### **FOR SUPPLY OF REINFORCED NONWOVEN COMPOSITE**

#### **(REINFORCEMENT, SEPARATION, FILTRATION & DRAINAGE APPLICATION ..... I. E. SUBGRADE STABILIZATION OF FLEXIBLE PAVEMENT & GUTTER APPLICATION)**

### **1.0 GENERAL**

This work comprises supply of Reinforced Non-woven composite conforming to the material specifications stated herein, as per the bill of quantity and schedule of supplies enclosed.

### **2.0 MATERIALS**

#### **2.1 General Requirements**

Reinforced Non-woven composites shall comprise a Non-woven Geotextile made from staple fibers only, reinforced with high tenacity polyester yarns in the machine and cross-machine directions. The polyester yarns shall have high molecular weight ( $> 25,000$  g/mol), low CEG ( $< 30$  mmol/kg), so as to ensure adequate durability. The reinforcement yarns shall be bonded to the Non-woven Geotextile base using a warp-knitting process. The product shall be resistant to the chemical and biological environments normally found in soils and shall be stable against short-term exposure to ultraviolet radiation.

Indigenously manufactured Non-woven Geotextile and Reinforced Non-woven composite shall be preferred, considering advantages of shorter delivery period, no inventory pipe-up and not much impact on cost due to fluctuation of exchange rate of foreign currency. Minimum 5.0 meter width of non-woven geocomposite shall be requiring minimizing the wastage.

A plant visit by the Engineer's representative to verify the manufacturer's quality control procedures and witness testing of products is also required prior to the dispatch of material.

#### **2.2 Transportation & Storage**

All rolls shall have a protective cover with a label or tag specifying name of the product, name of the manufacturer, roll number, date of manufacture and roll dimension.

Material shall be protected from sunlight, mud, dirt, debris, any other harmful substances or mechanical damage during transportation.

Rolls shall be stored in a secured area sufficiently elevated above the ground and adequately covered to protect them from the following: site construction damage, precipitation, prolonged exposure to ultraviolet radiation including sunlight, chemicals that are strong acids or strong bases, flames including welding sparks, high temperatures, and any

other environmental conditions that may damage the physical property values of the material.

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

### 2.3 Quality Control & testing

The quality management system of the manufacturer shall conform to the requirements of ISO 9001:2015.

Manufacturer Laboratory shall accredited by the National Accreditation Board for Testing Laboratories (NABL) as per ISO/ IEC 17025: 2005 standards and GAI LAP Accreditation by Geosynthetic Institute USA.

Manufacturer shall issue a test report stating minimum average roll values of material properties, at the time of shipment is made.

CE-certification as per 2016 standards (BTTG certification) should be required for supply of material.

Manufacturer shall submit the proof of supply and satisfactory performance for the quantity of 10000 Sqmt at least, for projects in India.

Contractor shall furnish proof of all above and it is mandatory.

### 2.4 Properties of Reinforced Non-woven Composite

The Mechanical properties of Reinforced Non-woven composite shall conform to Table-1 below:

Table-1

Properties	Test method	Unit	TGC 20/15	TGC 35/15	TGC 50/15	TGC 75/15	TGC 110/15	TGC 150/15	TGC 200/15	TGC 35/35	TGC 60/60	TGC 75/75	TGC 90/90	TGC 110/110	TGC 200/200
<b>Mechanical properties</b>															
Tensile Strength (min.) MD	EN ISO - 10319	kN/m	20	35	50	75	110	150	200	35	60	75	90	110	200
<b>Tensile Strength (min.) CD</b>	ASTM D 4595		15	15	15	15	15	15	15	15	35	60	75	90	110
Elongation at Nominal Strength MD	EN ISO - 10319	%	12	12	12	12	12	12	12	12	12	12	12	12	12
Elongation at Nominal Strength CD	ASTM D 4595		12	12	12	12	12	12	12	12	12	12	12	12	12
<b>Hydraulic Properties</b>															
Water permeability normal to the plane	EN ISO - 11058	l/m <sup>2</sup> /s	70 (-21)	70 (-21)	70 (-21)	70 (-21)	70 (-21)	70 (-21)	70 (-21)	70 (-21)	70 (-21)	70 (-21)	70 (-21)	70 (-21)	70 (-21)
Characteristic opening size (O <sub>95</sub> )	EN ISO - 12956	µm	150 (+50)	150 (+50)	150 (+50)	150 (+50)	150 (+50)	150 (+50)	150 (+50)	150 (+50)	150 (+50)	150 (+50)	150 (+50)	150 (+50)	150 (+50)
<b>Forms of Supply</b>															
Roll width		m	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Roll length		m	100	100	100	100	100	100	100	100	100	100	100	100	100

MD-Machine Direction

CD-Cross Direction

Minimum Average Roll value

### **3 INSTALLATION**

#### **3.1 Site Preparation**

The site shall be prepared by clearing, grubbing, and excavation or filling the area to the design grade. This includes removal of topsoil and vegetation.

#### **3.2 Laying of Reinforced Nonwoven Composite**

The Reinforced Nonwoven Composite shall be laid smooth without wrinkles or folds on the prepared subgrade.

Adjacent Reinforced Nonwoven Composite rolls shall be overlapped as shown on the drawings. Unless otherwise shown on the drawings or directed by the Engineer, the minimum overlap shall be 300 to 500 mm for subgrade of CBR greater than or equal to 3 and 600 to 1000 mm for CBR between 1 and 3. All roll ends shall be overlapped by 1000 mm.

On curves, the Reinforced Nonwoven Composite may be folded or cut to conform to the curves. The fold or overlap shall be in the direction of construction and held in place by pins, etc.

Prior to placing subgrade course material the installed Reinforced Nonwoven Composite shall be inspected and approved by the Engineer. Any damages shall be repaired by covering the damaged location with a Reinforced Nonwoven Composite patch, which extends an amount equal to the required overlap beyond the damaged area, as directed by the Engineer.

Movement of construction equipment directly over the Reinforced Nonwoven Composite shall not be permitted.

Sudden breaking and sharp turning of construction equipment shall be avoided over the Reinforced Nonwoven Composite.

Any ruts occurring during construction shall be filled with additional subgrade material, and compacted to the specified density

### **4 APPROVED MANUFACTURERS**

#### **4.1 Approved Manufacturers**

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

## **5.0 DELIVERY**

Delivery of Reinforced Non-woven composite shall be done according to the delivery schedule.

## **6.0 PAYMENT**

### **6.1 Method of Measurement**

Reinforced Non-woven composite will be measured by the Square Meter of material received at the owner's / contractor's store.

### **6.2 Basis of Payment**

Payment for the supply of Reinforced Non-woven composite shall be made at the contract unit price per Square Meter, which shall be full compensation for the cost of materials, transportation, duties and taxes.

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