

## **TENDER SPECIFICATIONS**

### **FOR SUPPLY OF PRE-FABRICATED VERTICAL DRAIN / BAND DRAIN**

### **( FOR GROUND IMPROVEMENT, SOIL CONSOLIDATION OF MARSHY LAND )**

#### **1.0 GENERAL**

This work comprises supply of Pre Fabricated Vertical Drain (PVD) / Band Drain 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**

Prefabricated vertical drains shall comprise a polymer core enclosed within a outer geotextile filter jacket / sleeve and shall be of newly manufactured materials.

The core shall be made of polypropylene or a similar polymer and shall be of continuous construction to facilitate drainage along the longitudinal axis of the drain The filter jacket shall be a polyester or polypropylene nonwoven geotextile and shall be capable of resisting all bending, punching and tensioning subjected to during the installation and the design life of the drain.

The prefabricated vertical drain shall be resistant to rotting, mildew, bacterial action, insect, acids, alkalis, solvents and other constituents in ground water.

Indigenously manufactured Pre Fabricated Vertical Drain (PVD) / Band Drain 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 250meter length roll 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 9001:2008 and In-house Laboratory should have certificate of NABL Accreditation ISO/IEC 17025:2005.

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

CE-certification (BTTG certification) should be required for supply of material.

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

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

### 2.4 Properties of Pre Fabricated Vertical Drain (PVD) / Band Drain

The properties of Pre Fabricated Vertical Drain (PVD) / Band Drain shall conform to Table-1 below:

Table-1

S.No	Property		Test Method	Type A	Type B
A	Composite Drain				
1	Width			100 mm	100 mm
2	Thickness		ASTM D5199	4.0 mm	5.0 mm
3	Mass per linear metre			90 g/m	110 g/m
4	Tensile strength		ASTM D4595	2.0 kN	2.5 kN
5	Elongation at break			35 %	35 %
6	Elongation at 0.5 kN			1.0 %	1.0 %
7	Discharge capacity (straight) @	i = 1.0, 300 kPa pressure	ASTM D4716	$95 \times 10^{-6} \text{ m}^3/\text{s}$	$135 \times 10^{-6} \text{ m}^3/\text{s}$
8		i = 1.0, 350 kPa pressure		$90 \times 10^{-6} \text{ m}^3/\text{s}$	$130 \times 10^{-6} \text{ m}^3/\text{s}$
9	Discharge capacity	i = 1.0, 250 kPa		$85 \times 10^{-6} \text{ m}^3/\text{s}$	$110 \times 10^{-6} \text{ m}^3/\text{s}$

10	(25 % buckled) @	pressure		
<b>B</b>	Core			
1	Material		Polypropylene	Polypropylene
2	Configuration / structure		Corrugated	Corrugated
3	Thickness	ASTM D5199	3.5 mm	5.0 mm
4	Tensile strength	ASTM D4595	1.3 kN	1.4 kN
5	Compressive strength	ASTM D1621	1000 kPa	1000 kPa
<b>C</b>	Filter			
1	Material		PP	PP
2	Structure		Nonwoven	Nonwoven
3	Mass per unit area	ASTM D5261	120 g/m <sup>2</sup>	120 g/m <sup>2</sup>
4	Tensile strength	ASTM D4632	500 N	500 N
5	Elongation at break		50 %	50 %
6	Trapezoid tear strength	ASTM D4533	120 N	120 N
7	Bursting strength	ASTM D3786	1100 kPa	1100 kPa
9	Permittivity	ASTM D 4491	0.3 s <sup>-1</sup>	0.3 s <sup>-1</sup>
10	Apparent opening size	ASTM D4751	≤120 μm	≤120 μm

### **3 APPROVED MANUFACTURERS**

#### **3.1 Approved Manufacturers**

- (1) Techfab (India) Industries Ltd.  
712 Embassy Centre,  
Nariman Point, Mumbai – 400 021  
Phone: 022 – 2287 6224/6225  
Fax: 022 – 2287 6218

#### **4.0 DELIVERY**

Delivery of Pre Fabricated Vertical Drain (PVD) / Band Drain shall be done according to the delivery schedule.

#### **5.0 PAYMENT**

##### **5.1 Method of Measurement**

Pre Fabricated Vertical Drain (PVD) / Band Drain will be measured by per Linear Meter of material received at the owner's / contractor's store.

##### **5.2 Basis of Payment**

Payment for the supply of Pre Fabricated Vertical Drain (PVD) / Band Drain 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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