

TENDER SPECIFICATION

FOR SUPPLY OF UNIAXIAL GEOGRID

(FOR REINFORCED SOIL WALL & SLOPE APPLICATION)

1.0 GENERAL

This work comprises supply of Knitted & Polymeric Coated Polyester Uniaxial GeoGrid as Reinforced Soil Slope and RE Wall 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

The Geogrid should be manufactured from high tenacity polyester filament yarns with molecular weight ≥ 25000 g/mol when measured in accordance with GRI-GG8 / ASTM D4603 and carboxyl end groups ≤ 30 mmol/Kg when measured in accordance with GRI GG7 / ASTM D2455.

The yarns shall be formed into a dimensionally stable grid structure with uniform square or rectangular apertures using a weft insertion warp knitting process (woven type Geogrids, Extruded type Geogrids, Welded type Geogrids will not be permitted and not accepted).

The Geogrid shall have a durable Polymeric coating to protect the yarns from mechanical damage and adverse environmental effects.

The Geogrid shall be resistant to the chemicals and microorganisms normally found in soils and shall be stabilized against short-term exposure to solar radiation

Indigenously manufactured Geogrids should be preferred, considering advantages of shorter delivery periods, no inventory pile-up and rates being not affected by fluctuation of exchange rate of foreign currency.

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 and Handling

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 Geogrid.

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 and ISO 45001, BBA certification and CE-certification as per 2016 standard should be required for supply of material.

Manufacturer Laboratory shall be accredited by the National Accreditation Board for Testing Laboratories (NABL) as per ISO/ IEC 17025: 2017 standards and GAI LAP Accreditation by Geosynthetic Institute USA.

Manufacturer should have geosynthetic-soil interaction in-house testing facility for large pullout apparatus for conducting laboratory pull-out tests on geosynthetics in accordance with ASTM D6706 and a large direct shear apparatus for evaluating the interface friction between geosynthetics and soil using the modified direct shear technique per IS 13326 (Part 1).

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

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

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

2.4 Physical and Mechanical Properties

The Mechanical properties of knitted and Polymeric coated uniaxial geogrid shall conform to Table-1 below:

Table-1

| Property | | Test Method | Unit | TG U 40 | TG U 60 | TG U 80 | TG U 100 | TG U 120 | TG U 150 | TG U 200 | TG U 250 | TG U 300 | TG U 350 | TG U 400 |
|--|-------------------------|-------------|-------|---------|---------|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| Ultimate tensile strength ¹ | MD | ASTM D 6637 | kN/m | 40 | 60 | 80 | 100 | 120 | 150 | 200 | 250 | 300 | 350 | 400 |
| | CD | | | 20 | 20 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| Reduction Factors (RF) and factor of safety (f_s) for calculation of MD Long-term Design Strength(LTDS) | | | | | | | | | | | | | | |
| Creep (RF _{CR}) -120 years design life at 30° C temperature | | | | 1.57 | 1.57 | 1.57 | 1.57 | 1.57 | 1.57 | 1.57 | 1.57 | 1.57 | 1.57 | 1.57 |
| Installation damage (RF _{ID}) | Sand/silt/clay | | | 1.05 | 1.05 | 1.05 | 1.05 | 1.05 | 1.05 | 1.05 | 1.05 | 1.05 | 1.05 | 1.05 |
| | Coarse gravel (37.5 mm) | | | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 |
| Durability (RF _{CH}), 120 years design life at 20°C, pH = 4 to 9 | | | | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 |
| Weathering (RF _W) | To be covered in 1 day | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| LTDS – 120 years : Sand/silt/clay pH -4-9 kN/m | | | | 21.10 | 31.65 | 42.20 | 52.75 | 63.30 | 79.12 | 105.50 | 131.9 | 158.25 | 184.62 | 211.00 |
| LTDS – 120 years : Gravel < 37.5 pH -4-9 kN/m | | | | 19.26 | 28.89 | 38.53 | 48.16 | 57.79 | 72.24 | 96.32 | 120.4 | 144.49 | 168.57 | 192.65 |
| Physical properties | | | | | | | | | | | | | | |
| Aperture size (Tolerance± 3 mm) | | mm | 50x25 | 50x25 | 50x25 | 30x23 | 30x23 | 30x23 | 30x23 | 30x22 | 30x20 | 30x20 | 30x20 | 30x18 |
| Roll dimensions | | | | | | | | | | | | | | |
| Roll length | | m | 100 | | | 100 | | | | | | | | |
| Roll width | | m | 5.0 | | | 5.1 | | | | | | | | |

¹ Minimum average roll value (Minimum refers to 95 % confidence limit.) MD – Machine Direction
CD – Cross Direction.

3 INSTALLATION

3.1 Site Preparation

Site shall be prepared as per the approved design and drawing for the application such as Reinforced Soil Wall and Slope.

3.2 Placement of Geogrid

Laying of Geogrid shall be carried out as per the approved drawing and strictly under the supervision of the Engineer In Charge. The geogrid shall be laid smooth without wrinkles or folds on the prepared surface, as per the approved method statement. Laying of Geogrid for these applications are carried out in such a manner that the machine direction of geogrid shall be perpendicular to wall / slope face (Higher tensile strength direction perpendicular to wall and slope facing).

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 DELIVERY

Delivery of Uniaxial geogrids shall be done according to the delivery schedule.

6 PAYMENT

6.1 Method of Measurement

Uniaxial geogrids 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 Uniaxial geogrids 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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