REINFORCED FILL PRODUCT DESIGN DATA SHEET No. RF 4/2025 For TechFab TechGrid

Date Issued: 10 December 2025
Valid Until: 9 December 2027

Reinforced Fill Products:	TechFab TechGrid TGU40, TGU60, TGU80, TGU100, TGU120, TGU150, TGU200, TGU250, TGU300, TGU350 and TGU400
Manufacturer:	TechFab India Industries Ltd. 46/47, Maker Chamber VI, Nariman Point, Mumbai, Maharashtra-400021, India
Product distributor:	1. TechFab India Industries Ltd. Factory, Survey No. 60/4P, Plot-18, Village Karajgam, Silvassa – 396230, India 2. TechFab India Industries Ltd. Factory, Survey No. 99/2/6, Village Rakholi, Madhuban Dam Road, Silvassa – 396230, Dadra and Nagar Haveli, India 3. TechFab (India) Industries Limited, C-1B, C-2 & C-3, Industrial Area, Phase-II, Mandideep – 462046, Dist.: Raisen, Madhya Pradesh, India

Important Notice and Disclaimer

This Design Data Sheet is intended for geotechnical professionals designing with TechFab TechGrid geogrids for application in Hong Kong only. Users are solely responsible for (1) selecting the appropriate TechFab TechGrd geogrids for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and other safety, regulatory or other requirements. Civil Engineering and Development Department of HKSAR Government makes no representation as to the presence or absence of patent rights subsisting in the product and/or as to the legal right of the manufacturer and product distributor to market, install or maintain the product.

Where the TechFab TechGrid geogrids are used in permanent reinforced fill structures in Hong Kong, the design tensile strengths of the product shall comply with the values specified in Tables 3 to 9 of this Design Data Sheet, and the design shall be in accordance with Geoguide 6 – Guide to Reinforced Fill Structure and Slope Design (GEO, 2022).

This Design Data Sheet shall cease to be valid if the product data or specifications are withdrawn or re-issued in an amended form by the manufacturer. Applications for amendment to this Design Data Sheet shall be made to the Deputy Head of Geotechnical Engineering Office (Planning and Testing) of the Civil Engineering and Development Department by the manufacturer for all cases of changes in the products, the manufacturing details or the conditions of use, or of changes of the product distributor.

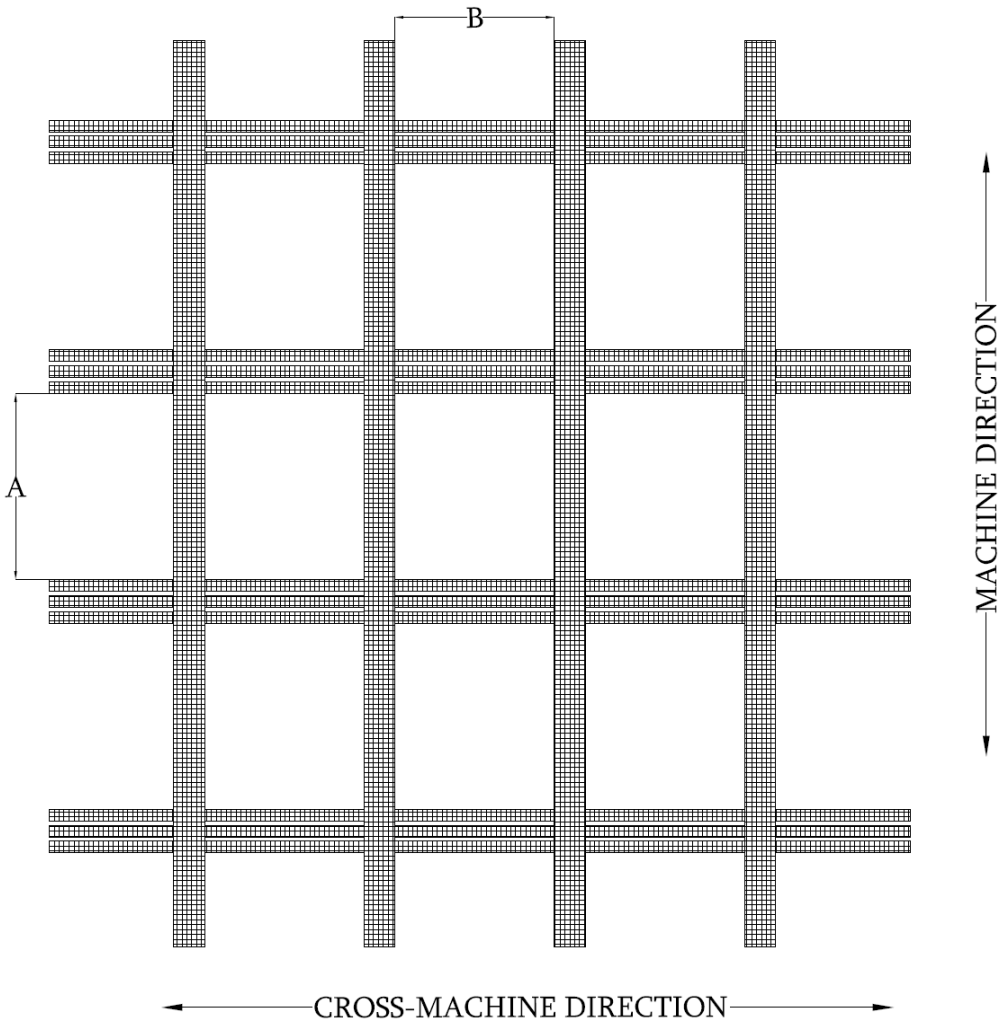
This Design Data Sheet is subject to change without notice. Users of this Design Data Sheet are advised to check the prevailing requirements as stipulated in the latest version of the Design Data Sheet by referring to the Civil Engineering and Development Department's website at https://www.cedd.gov.hk/eng/public-services-forms/geotechnical/reinforced/index.html.

TechFab TechGrid geogrids

TechFab TechGrid geogrids are intended to be used as reinforcing elements in reinforced fill structures. The products consist of uniaxial knitted polyester geogrids with a protective, proprietary coating. which contain a minimum 2.0 % of carbon black master batch as a stabilizer for protection against UV degradation. TechGrid geogrids are manufactured from high-tenacity polyester yarn with a minimum molecular weight of 25,000 g/mol and a maximum carboxyl end group count of 30 mmol/Kg, tested according to ASTM D 4603 / GRI-GG8 and ASTM D 7409 / GRI-GG7, respectively.

The geometric view of the product are shown in Figure 1 below. Figure 2 and Figure 3 below show images of the products TGU100 and TGU120 respectively as examples.

The typical dimensions, mass and identification of the products are given in Table 1A and Table 1B.



A: APERTURE SIZE (MM) IN MACHINE DIRECTION
B: APERTURE SIZE (MM) IN CROSS-MACHINE DIRECTION

Figure 1 – Geometric view of TechGrid

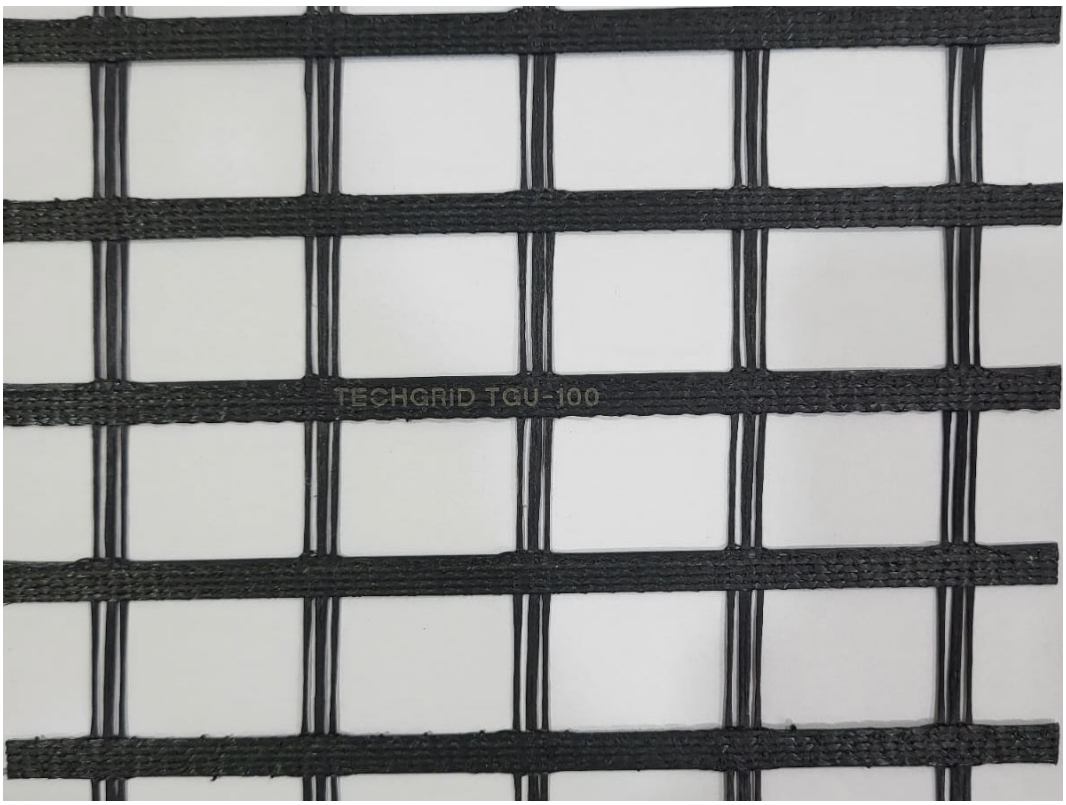


Figure 2 – Product image (TGU100)

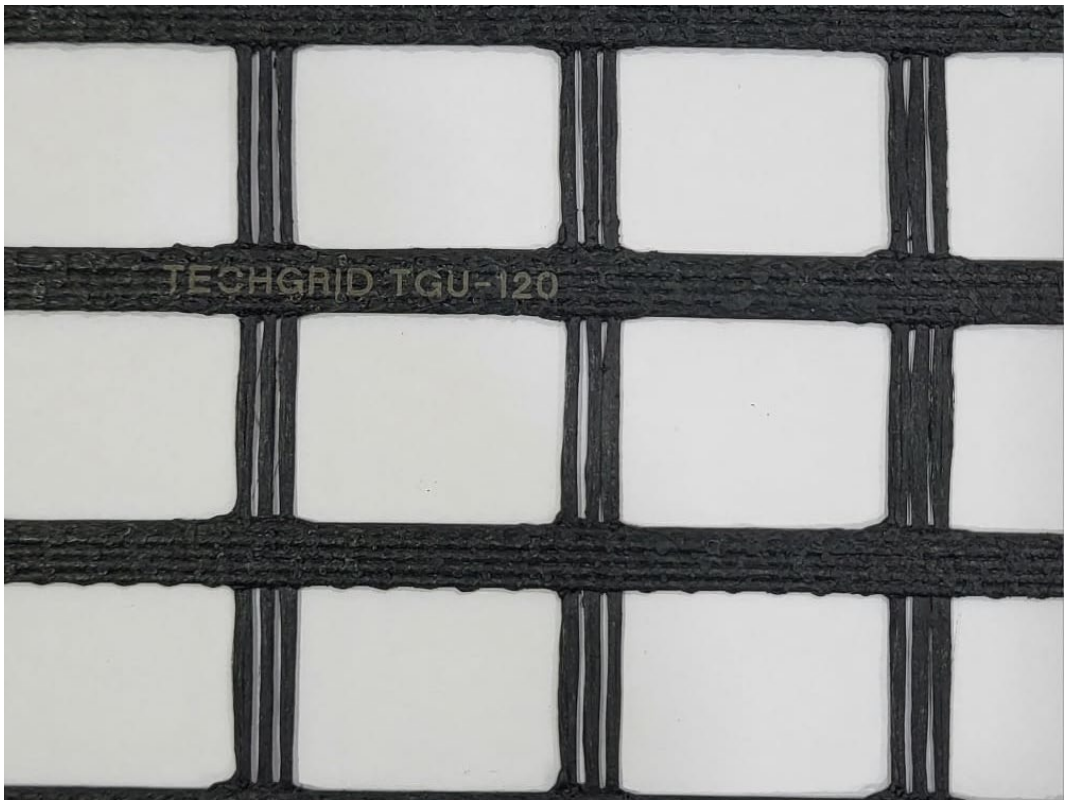


Figure 3 – Product image (TGU120)

Product grade	TGU40	TGU60	TGU80	TGU100	TGU120	TGU150
Aperture Size[1] (A × B, mm × mm)	30 × 25	30 × 25	30 × 25	30 × 23	30 × 23	30 × 23
Roll Width[2] (m)	3.9 / 5.1 / 5.9					
Roll Length[3] (m)	100 (default)					
Mass per roll[4] (kg)	86 / 112 / 130	96 / 126 / 146	120 / 157 / 183	131 / 182 / 199	154 / 202 / 234	181 / 237 / 274
Colour Code	Red	Orange	Yellow	Black	Green	Sky Blue

Note:
1 – Tolerance of +/- 2 mm.
2 – Roll width comes in three options. Tolerance of +/- 10 mm.
3 – Tolerance of + 1 m. Roll length can be customised.
4 – Mass per roll data are presented in the order of the available roll width options.

Table 1A – Dimensions, mass and identification of TechGrid (TGU40 to TGU150)

Product grade	TGU200	TGU250	TGU300	TGU350	TGU400
Aperture Size[1] (A × B, mm × mm)	30 × 23	30 × 22	30 × 20	30 × 20	30 × 18
Roll Width[2] (m)	3.9 / 5.1 / 5.9				
Roll Length[3] (m)	100 (default)				
Mass per roll[4] (kg)	230 / 301 / 348	255 / 334 / 387	294 / 384 / 443	331 / 433 / 502	379 / 495 / 573
Colour Code	White	Tan	White-Black	White-Blue	White-Yellow

Note:
1 – Tolerance of +/- 2 mm.
2 – Roll width comes in three options. Tolerance of +/- 10 mm.
3 – Tolerance of + 1 m. Roll length can be customised.
4 – Mass per roll data are presented in the order of the available roll width options.

Table 1B – Dimensions, mass and identification of TechGrid (TGU200 to TGU400)

Tensile strength and load-strain properties

Quality control tensile tests are performed on specimens in accordance with BS EN ISO 10319:2015 (BSI, 2015). The characteristic short-term tensile strengths in the geogrids guaranteed by TechFab India are provided in Table 2. The load-strain properties of TechGrid geogrids are shown in Figure 2. The actual strain at break is approximately 12 %.

Product grade	TGU 40	TGU 60	TGU 80	TGU 100	TGU 120	TGU 150	TGU 200	TGU 250	TGU 300	TGU 350	TGU 400
Characteristic short-term tensile strength (kN/m)	40	60	80	100	120	150	200	250	300	350	400

Table 2 – Characteristic short-term tensile strength

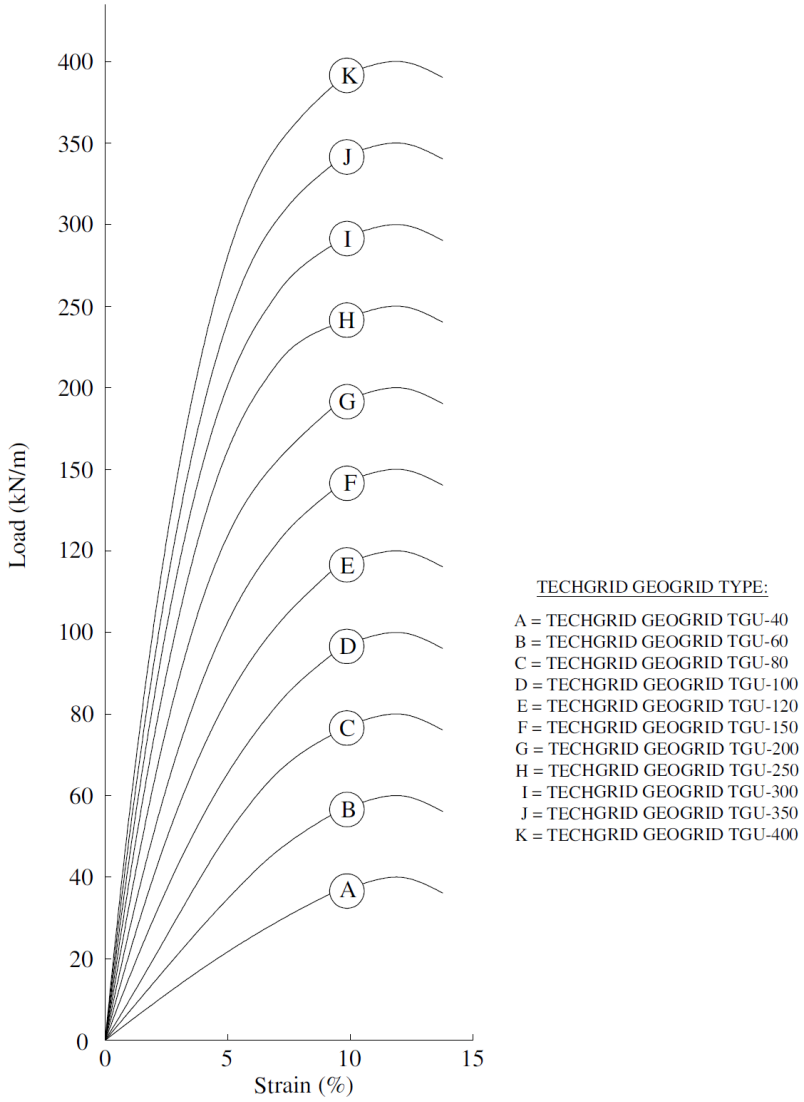


Figure 2 – Typical short-term load-strain properties

Quality assurance

TechFab TechGrid geogrids supplied to Hong Kong are manufactured by TechFab India Industries Ltd in Mumbai, India. The TechFab TechGrid geogrids TGU40, TGU60, TGU80, TGU100, TGU120, TGU150, TGU200, TGU250, TGU300, TGU350 and TGU400 are manufactured in a facility with ISO 9001 Quality Assurance Certificate. The testing laboratory is accredited with ISO/IEC 17025:2017 and Geosynthetic Accreditation Institute – Laboratory Accreditation Program (GAI-LAP).

Identification

TechFab TechGrid geogrids are imported into Hong Kong from India. Each roll of TechFab TechGrid geogrids has an identification label with particulars of the product and its manufacturing code and it is wrapped with a tape having a specific colour (Table 1A & Table 1B). A copy of the manufacturer's test certificate will accompany each shipment of delivery and the test certificate is available from the product distributor.

Design Aspects

Design tensile strength

According to Geoguide 6 – Guide to Reinforced Fill Structure and Slope Design (GEO, 2022), the design tensile strength, T_D, per unit width of reinforcement is:

$$T_D = \frac{T_{ult}}{\gamma_m \gamma_n}$$

where T_{ult} = characteristic short-term tensile strength guaranteed by TechFab India (see Table 2)

γ_m = partial material factor on tensile strength of geogrids

γ_n = partial consequence factor to account for consequence of failure

The design tensile strength values of the TechFab TechGrid geogrids given in Tables 3 to 9, which have been agreed with TechFab India, shall be used.

Particle size of fill material (mm)	γm	Design tensile strength (kN/m)	
		γn = 1.0	γn = 1.1
$D_{85} \leq 10$	1.79	22.4	20.3
$10 < D_{85} \leq 25$	1.79	22.4	20.3
$25 < D_{85} \leq 40$	2.93	13.7	12.4

Table 3 – Design tensile strengths of TechFab TechGrid TGU40 geogrids

Particle size of fill material (mm)	γm	Design tensile strength (kN/m)	
		γn = 1.0	γn = 1.1
$D_{85} \leq 10$	1.66	36.2	32.9
$10 < D_{85} \leq 25$	1.79	33.5	30.5
$25 < D_{85} \leq 40$	1.85	32.4	29.4

Table 4 – Design tensile strengths of TechFab TechGrid TGU60 geogrids

Particle size of fill material (mm)	γm	Design tensile strength (kN/m)	
		γn = 1.0	γn = 1.1
$D_{85} \leq 10$	1.66	48.2	43.8
$10 < D_{85} \leq 25$	1.79	44.7	40.7
$25 < D_{85} \leq 40$	1.85	43.1	39.2

Table 5 – Design tensile strengths of TechFab TechGrid TGU80 geogrids

Particle size of fill material (mm)	γm	Design tensile strength (kN/m)	
		γn = 1.0	γn = 1.1
$D_{85} \leq 10$	1.66	60.3	54.8
$10 < D_{85} \leq 25$	1.79	55.9	50.8
$25 < D_{85} \leq 40$	1.85	53.9	49.0

Table 6 – Design tensile strengths of TechFab TechGrid TGU100 geogrids

Particle size of fill material (mm)	γm	Design tensile strength (kN/m)	
		γn = 1.0	γn = 1.1
$D_{85} \leq 10$	1.66	72.3	65.8
$10 < D_{85} \leq 25$	1.79	67.1	61.0
$25 < D_{85} \leq 40$	1.85	64.7	58.8

Table 7 – Design tensile strengths of TechFab TechGrid TGU120 geogrids

Particle size of fill material (mm)	γm	Design tensile strength (kN/m)	
		γn = 1.0	γn = 1.1
$D_{85} \leq 10$	1.85	80.9	73.5
$10 < D_{85} \leq 25$	1.79	83.8	76.2
$25 < D_{85} \leq 40$	1.84	81.6	74.2

Table 8 – Design tensile strengths of TechFab TechGrid TGU150 geogrids

Particle size of fill material (mm)	γ_m	Design tensile strength (kN/m)	
		γ_n = 1.0	γ_n = 1.1
$D_{85} \leq 10$	1.97	101.6	92.4
$10 < D_{85} \leq 25$	1.97	101.6	92.4
$25 < D_{85} \leq 40$	2.07	96.8	88.0

Table 9 – Design tensile strengths of TechFab TechGrid TGU200 geogrids

Particle size of fill material (mm)	γ_m	Design tensile strength (kN/m)	
		γ_n = 1.0	γ_n = 1.1
$D_{85} \leq 10$	1.97	101.6	92.4
$10 < D_{85} \leq 25$	1.97	101.6	92.4
$25 < D_{85} \leq 40$	2.07	96.8	88.0

Table 10 – Design tensile strengths of TechFab TechGrid TGU250 geogrids

Particle size of fill material (mm)	γ_m	Design tensile strength (kN/m)	
		γ_n = 1.0	γ_n = 1.1
$D_{85} \leq 10$	1.97	101.6	92.4
$10 < D_{85} \leq 25$	1.97	101.6	92.4
$25 < D_{85} \leq 40$	2.07	96.8	88.0

Table 11 – Design tensile strengths of TechFab TechGrid TGU300 geogrids

Particle size of fill material (mm)	γ_m	Design tensile strength (kN/m)	
		$\gamma_n = 1.0$	$\gamma_n = 1.1$
$D_{85} \leq 10$	1.97	101.6	92.4
$10 < D_{85} \leq 25$	1.97	101.6	92.4
$25 < D_{85} \leq 40$	2.07	96.8	88.0

Table 12 – Design tensile strengths of TechFab TechGrid TGU350 geogrids

Particle size of fill material (mm)	γ_m	Design tensile strength (kN/m)	
		$\gamma_n = 1.0$	$\gamma_n = 1.1$
$D_{85} \leq 10$	1.97	203.3	184.8
$10 < D_{85} \leq 25$	1.97	203.3	184.8
$25 < D_{85} \leq 40$	2.07	193.7	176.1

Table 13 – Design tensile strengths of TechFab TechGrid TGU400 geogrids

The following notes apply to Tables 3 to 13:

(a) The design tensile strengths given in Tables 3 to 13 are in kN per meter width of geogrid.

(b) The roll widths can be found in Table 1A and Table 1B.

(c) D_{85} is the particle size corresponding to 85 % by weight of particles passing in a grading test.

(d) The partial material factor, γ_m, applies to the tensile strength of the individual grades of TechFab TechGrid geogrids. It has taken into account the environmental effects on material durability, construction damage and other special factors including hydrolysis, creep and stress rupture for a 120-year design life at a design temperature of 30°C.

(e) The fill material used within the reinforced fill block shall comply with the requirements specified for the Type I materials given in Geoguide 6 (GEO, 2022). In addition, the maximum particle size and the D_{85} value of the fill material shall not exceed 150 mm and 50 mm respectively.

Fill-to-reinforcement interaction

According to Geoguide 6 (GEO, 2022), the design coefficients of fill-to-reinforcement interaction μ_{dsD} and μ_{pD} relating to direct sliding resistance and pullout resistance respectively are:

$$\mu_{dsD} = \frac{\alpha_{ds} \tan \phi'}{\gamma_m \gamma_n}$$

$$\mu_{pD} = \frac{\alpha_p \tan \phi'}{\gamma_m \gamma_n}$$

where μ_{dsD} = design coefficient of interaction against direct sliding
μ_{pD} = design coefficient of interaction against pullout
γ_m = partial material factor for fill-to-reinforcement interaction
γ_n = partial consequence factor to account for consequence of failure
α_{ds} = direct sliding coefficient
α_p = pullout coefficient

In preliminary design, the direct sliding coefficient, α_{ds} and the pullout coefficient, α_p given in Table 10 below, which have been agreed with TechFab India, may be used. The partial material factor, γ_m, for fill-to-reinforcement interaction shall be taken as 1.2.

Interaction coefficient	Fill material
	Type I fill
Direct sliding coefficient α_{ds}	0.67
Pullout coefficient α_p	0.67

Table 10 – Direct sliding and pullout coefficients

The design coefficients of fill-to-reinforcement interaction should be verified by tests in accordance with the requirements of Clause A.61 and Clause A.62 given in the Appendix A of Geoguide 6 (GEO, 2022).

Facings

The typical facing types recommended by TechFab India for the construction of reinforced fill structures using TechFab TechGrid geogrids are presented in Appendix A. The suitability of these facing types should be carefully assessed by the designer and suitably modified to suit the individual design situations and contract requirements. The various design situations that need to be considered in the design of reinforced fill structures are discussed in Geoguide 6 (GEO, 2022).

Compliance Testing

The materials used for the construction of the reinforced fill structures should be inspected and tested on a regular basis during construction. Testing is required to ensure that the materials conform to the specification. Particular attention should be given to materials which can change properties; these include reinforcing elements and fill. Fill from different sources may have different material parameters and should be checked for compliance. Each main delivery of reinforcement should be sampled, tested and properly labelled.

The requirements for the testing of materials are recommended in the Appendix A of Geoguide 6 (GEO, 2022).

References

ASTM (2018). Standard Test Method for Determining Inherent Viscosity of Poly(Ethylene Terephthalate) (PET) by Glass Capillary Viscometer (ASTM D4603-18). American Society for Testing and Materials, USA.

ASTM (2020). Standard Test Method for Carboxyl End Group Content of Polyethylene Terephthalate (PET) Yarns (ASTM D7409-15(2020)). American Society for Testing and Materials, USA.

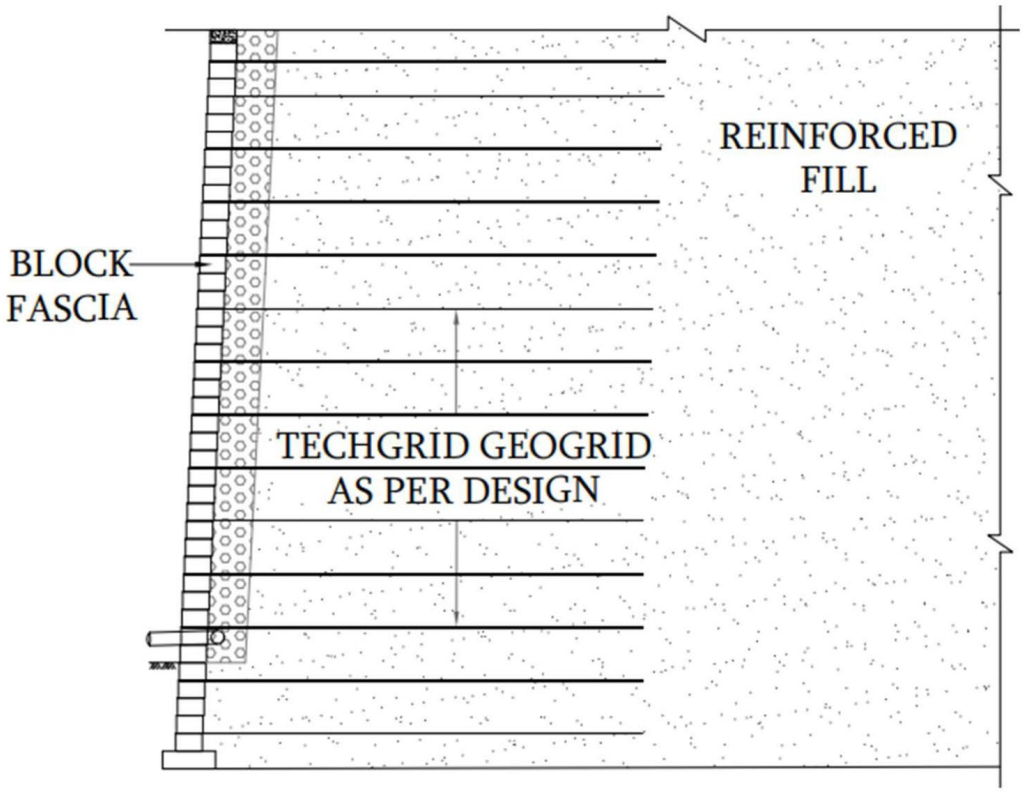
BSI (2015). Geotextiles – Wide width tensile test (BS EN ISO 10319:2015). British Standards Institution, London.

GEO (2022). Guide to Reinforced Fill Structure and Slope Design (Geoguide 6) (Continuously Updated E-Version released on 27 October 2022). Geotechnical Engineering Office, Civil Engineering and Development Department, HKSAR Government, 218 p.

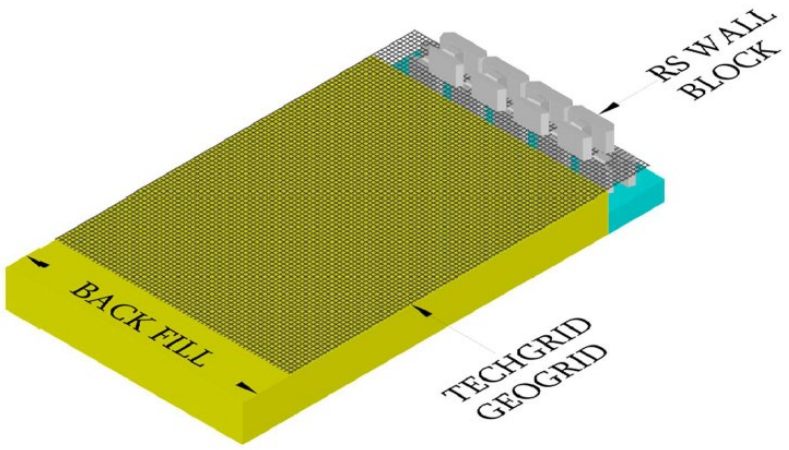
Geotechnical Engineering Office
Civil Engineering and Development Department
December 2025

Appendix A

Arrangement of facing panels – Segmental block fascia



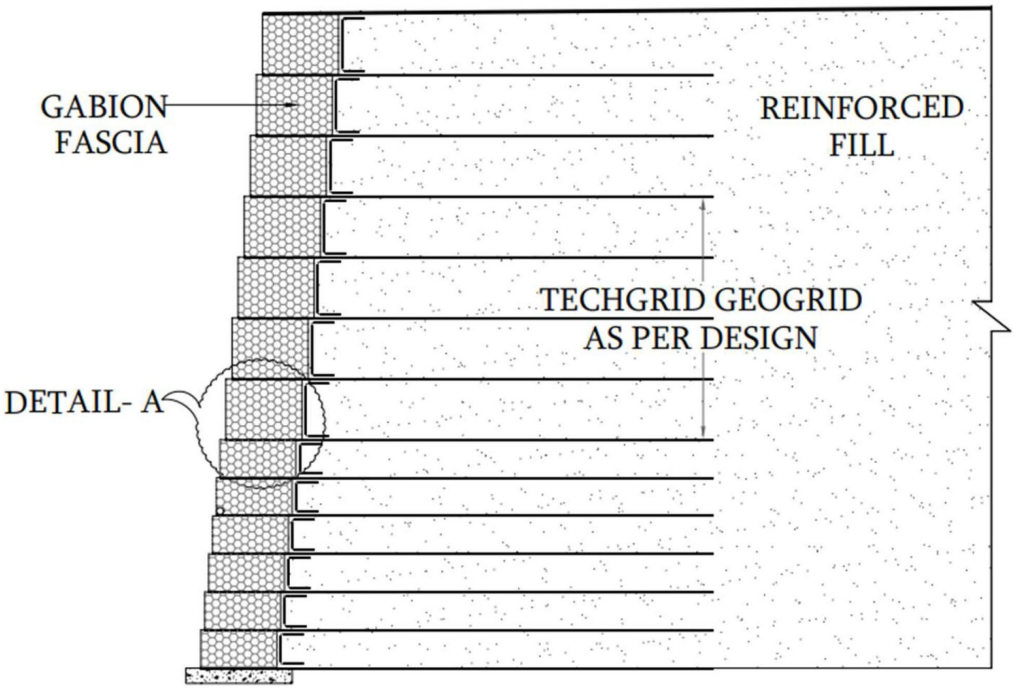
Typical Cross Section of Reinforced Fill Structure using TechGrid Geogrids with Segmental Block Fascia



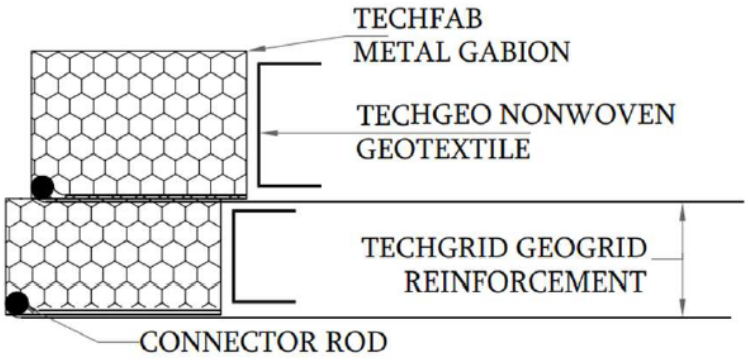
Typical Isometric View of Reinforced Fill Structure using TechGrid Geogrids with Segmental Block Fascia

Appendix A

Arrangement of facing panels – Gabion fascia

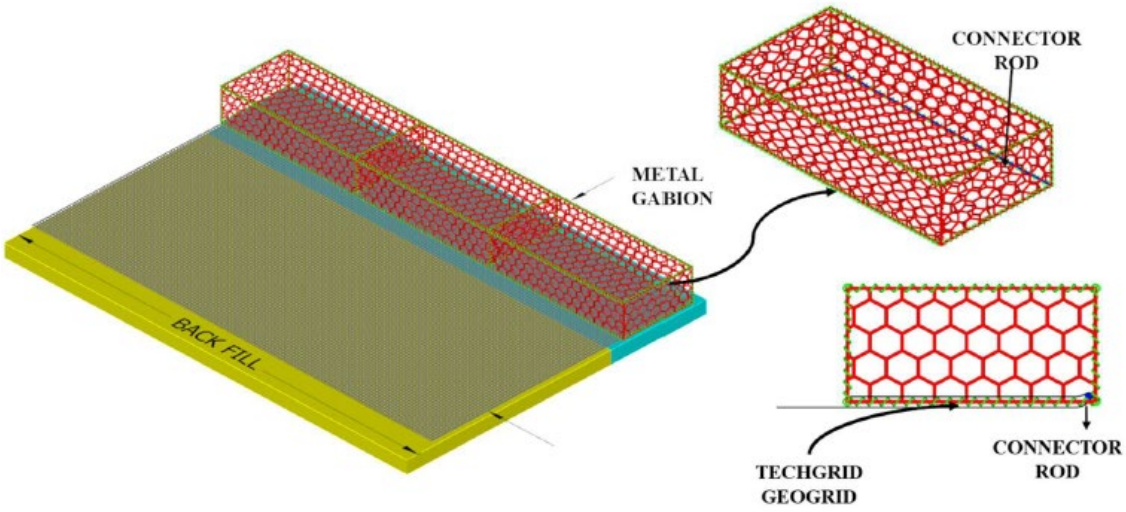


Typical Cross Section of Reinforced Fill Structure using TechGrid Geogrids with Gabion Fascia



Detail 'A' of Reinforced Fill Structure using TechGrid Geogrids with Gabion Fasica

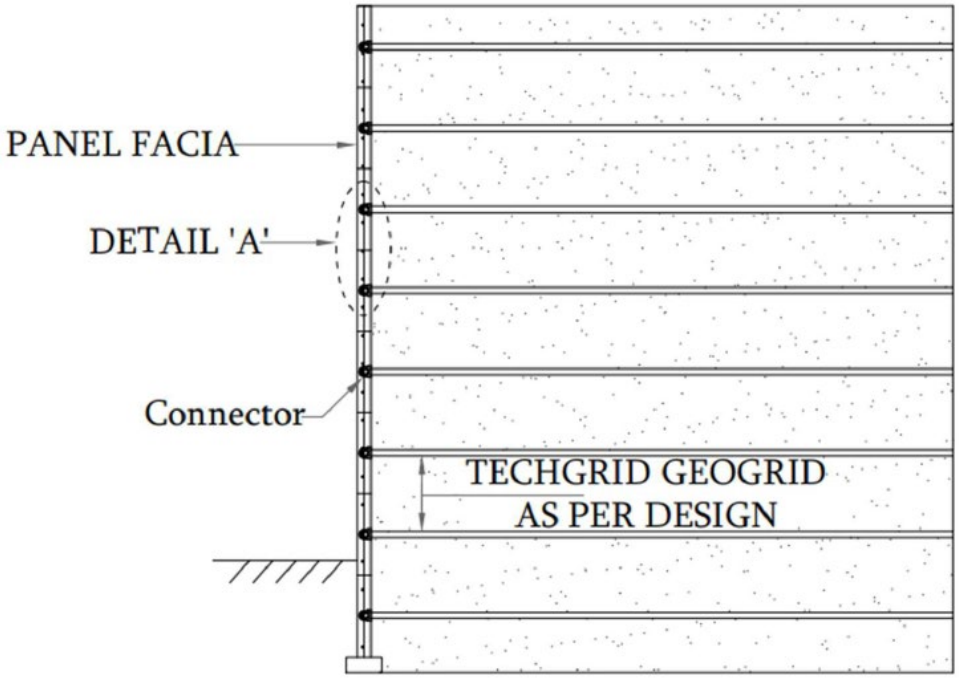
Arrangement of facing panels – Gabion fascia (Cont'd)



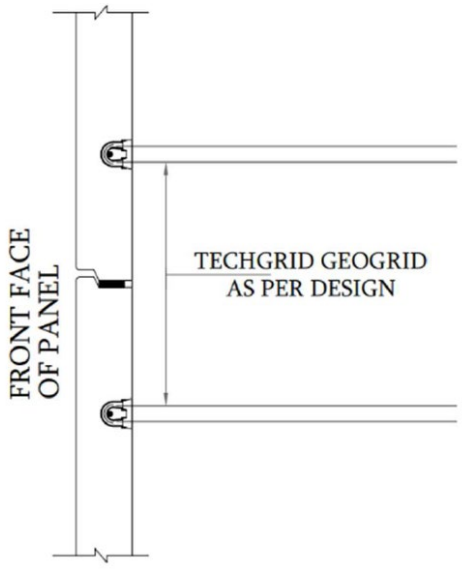
Typical Isometric View of Reinforced Fill Structure using TechGrid Geogrids with Gabion Fasica

Appendix A

Arrangement of facing panels – Panel fascia



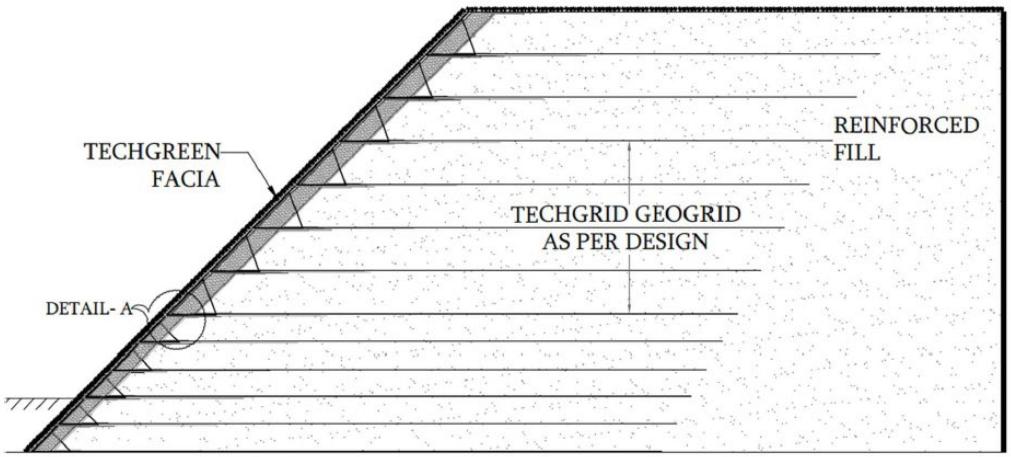
Typical Cross Section of Reinforced Fill Structure using TechGrid Geogrids with Panel Fascia



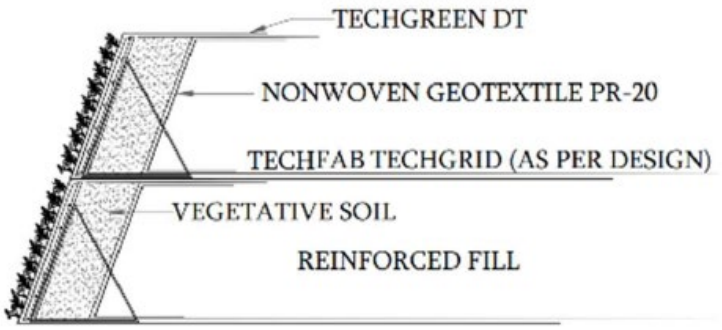
Detail 'A' of Reinforced Fill Structure using TechGrid Geogrids with Gabion Fasica

Appendix A

Reinforced fill slope



Typical Cross Section of Reinforced Fill Slope using TechGrid Geogrids



Detail 'A' of Reinforced Fill Slope