HAPAS

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BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION

HAPAS Certificate
15/H231
Product Sheet 1

TENCATE GEOSYNTHETICS

MIRAGRID GX GEOGRIDS

This HAPAS Certificate Product Sheet(1) is issued by the British Board of Agrément (BBA), supported by the Highways Agency (HA) (acting on behalf of the Overseeing Organisations of the Department for Transport; Transport Scotland; the Welsh Assembly Government and the Department for Regional Development, Northern Ireland), the Association of Directors of Environment, Economy, Planning and Transport (ADEPT), the Local Government Technical Advisers' Group and industry bodies. HAPAS Certificates are normally each subject to a review every three years.

(1) Hereinafter referred to as 'Certificate'.

This Certificate relates to Miragrid GX Geogrids, comprising a regular open network of integrally-connected elements of high-tenacity polyester yarn, coated with a protective layer of black polyvinyl chloride, for use as reinforcement in embankments with slope angles up to 70°.

CERTIFICATION INCLUDES:

- factors relating to compliance with HAPAS requirements
- factors relating to compliance with Regulations where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.

KEY FACTORS ASSESSED

Soil/geogrid interaction — interaction between the soil and geogrids has been considered and coefficients relating to direct sliding and pull-out resistance proposed (see section 6).

Mechanical properties — short- and long-term tensile strength and elongation properties of the geogrids and loss of strength owing to installation damage have been assessed and reduction factors established for use in design (see section 7).

Durability — the resistance of the geogrids to the effects of hydrolysis, chemical and biological degradation, UV exposure and temperature conditions normally encountered in civil engineering practice have been assessed and reduction factors established for use in design (see sections 8 and 11).

The BBA has awarded this Certificate to the company named above for the products described herein. These products have been assessed by the BBA as being fit for their intended use provided they are installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of First issue: 24 March 2015

Brian Chamberlain
Head of Approvals — Engineering

Claire Curtis-Thomas
Chief Executive

The BBA is a UKAS accredited certification body — Number 113. The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk

Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.

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Requirements

In the opinion of the BBA, Miragrid GX Geogrids, when used in accordance with the provisions of this Certificate, will meet the requirements of the Highways Agency and local Highway Authorities for the design and construction of reinforced soil embankments with slope angles up to 70°.

Regulations

Construction (Design and Management) Regulations 2007

Construction (Design and Management) Regulations (Northern Ireland) 2007

Information in this Certificate may assist the client, CDM co-ordinator, designer and contractors to address their obligations under these Regulations.

See sections: 1 *Description* (1.2), 3 *Delivery and site handling* (3.1, 3.3 and 3.4) and 13 *Procedure* (13.1) of this Certificate.

Additional Information

CE marking

The Certificate holder has taken the responsibility of CE marking the products in accordance with harmonised European Standard BS EN 13251 : 2001. An asterisk (*) appearing in this Certificate indicates that data shown are given in the Manufacturer's Declaration of Performance.

Technical Specification

1 Description

1.1 Miragrid GX Geogrids are planar structures consisting of a regular open network of integrally-connected tensile elements of high-tenacity polyethylene terephthalate (PET) yarn, coated with a protective layer of black polyvinyl chloride.

1.2 The range of Miragrid GX Geogrids covered by this Certificate is listed in Table 1. The characteristics of the geogrids are shown in Table 2. A typical configuration for the geogrids is illustrated in Figure 1.

Figure 1 Miragrid GX Geogrids

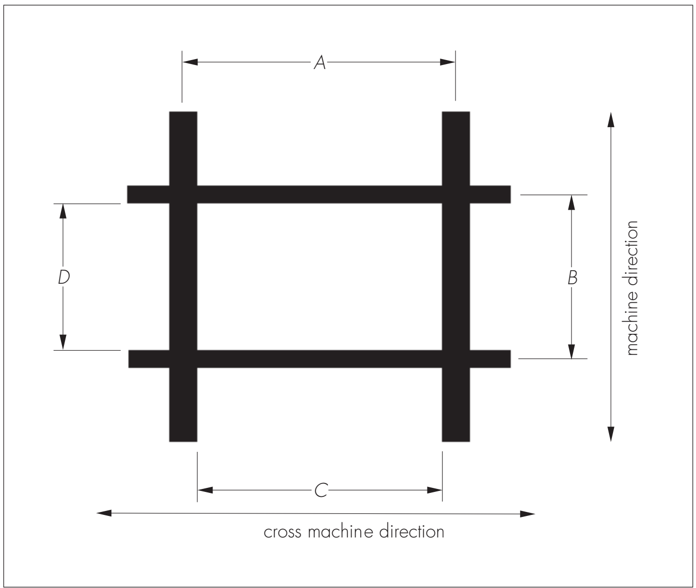


Table 1 General specification

Grade	Nominal mass(1) (g·m⁻²)	Average grid size(2) (mm) MD/CMD(3) *A* x *B*	Average aperture size(2) (mm) MD/CMD(3) *C* x *D*	Colour code(4)	Roll width 5.20 m	
					Nominal roll weight (kg)	Nominal roll length (m)
GX 20/20	170	25 x 28	22 x 25	red and green	105	100
GX 35/20	190	25 x 28	22 x 25	orange and green	125	100
GX 35/35	255	25 x 29	22 x 25	orange	151	100
GX 55/30	255	25 x 28	21 x 25	yellow	155	100
GX 55/55	365	25 x 27	21 x 21	white	205	100
GX 80/30	315	25 x 28	20 x 25	red and blue	190	100
GX 80/80	540	25 x 29	20 x 25	red	303	100
GX 110/30	422	25 x 28	20 x 25	white and blue	245	100
GX 160/30	550	25 x 28	19 x 25	white and orange	165	50
GX 200/30	660	25 x 28	18 x 25	white and green	193	50
GX 400/30	1270	25 x 28	15 x 25	white and red	337	50

(1) Mass/unit area measured in accordance with BS EN ISO 9864 : 2005.
(2) Reference dimensions (see Figure 1).
(3) MD: machine direction, CMD: cross machine direction.
(4) Colour coding in accordance with BS EN ISO 10320 : 1999.

Table 2 Performance characteristics

Grade	Machine Direction (MD)				Cross Machine Direction (CMD)			
	Short term tensile strength(1) (kN per m width)			Mean strain at maximum tensile strength(1) (%) (*)	Short term tensile strength(1) (kN per m width)			Mean strain at maximum tensile strength(1) (%) (*)
	Mean value (*)	Tolerance (*)	T_{char}(2)		Mean value (*)	Tolerance (*)	T_{char}(2)	
GX 20/20	21	+0/−1.0	20.0	10.5 (±2.1)	21	+0/−1.0	20.0	10.5 (±2.0)
GX 35/20	38	+0/−2.8	35.2	10.5 (±2.1)	20	+0/−5.0	15.0	12.0 (+5.0/−4.0)
GX 35/35	38	+0/−2.8	35.2	10.5 (±2.1)	38	+0/−2.8	35.2	10.0 (±2.0)
GX 55/30	58	+0/−2.9	55.1	10.5 (±2.1)	30	+0/−5.0	25.0	12.0 (+5.0/−4.0)
GX 55/55	58	+0/−2.9	55.1	10.5 (±2.1)	58	+0/−2.9	55.1	10.0 (±2.0)
GX 80/30	84	+0/−4.0	80.0	10.5 (±2.1)	30	+0/−5.0	25.0	12.0 (+5.0/−4.0)
GX 80/80	84	+0/−4.0	80.0	10.5 (±2.1)	84	+0/−4.0	80.0	10.0 (±2.0)
GX 110/30	116	+0/−5.8	110.2	10.5 (±2.1)	30	+0/−5.0	25.0	12.0 (+5.0/−4.0)
GX 160/30	168	+0/−8.0	160.0	10.5 (±2.1)	30	+0/−5.0	25.0	12.0 (+5.0/−4.0)
GX 200/30	210	+0/−10.0	200.0	10.5 (±2.1)	30	+0/−5.0	25.0	12.0 (+5.0/−4.0)
GX 400/30	420	+0/−20.0	400.0	10.5 (±2.1)	30	+0/−5.0	25.0	12.0 (+5.0/−4.0)

(1) Values derived from short-term tests in accordance with BS EN ISO 10319 : 2008.
(2) The characteristic short-term tensile strength (T_{char}) values are the mean short-term tensile strength minus 1 x the tolerance value in accordance with BS EN 13251 : 2001.

1.3 The machine direction is along the roll and is indicated by printed paper strip.

2 Manufacture

2.1 The geogrids are manufactured from fibres of high-tenacity polyester yarn which are knitted together to form grids. A beam yarn is used to cross-weave the weft and warp yarn bundles together at their points of contact. The product is then coated with a protective layer of black polyvinyl chloride.

2.2 As part of the assessment and ongoing surveillance of product quality, the BBA has:

- agreed with the manufacturer the quality control procedures and product testing to be undertaken
- assessed and agreed the quality control operated over batches of incoming materials
- monitored the production process and verified that it is in accordance with the documented process
- evaluated the process for management of nonconformities
- checked that equipment has been properly tested and calibrated
- undertaken to carry out the above measures on a regular basis through a surveillance process, to verify that the specifications and quality control operated by the manufacturer are being maintained.

2.3 The management system of Tencate Geosynthetics Austria Gesellschaft m.b.H. has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 by IQ Net/Quality Austria (Certificate AT-00631/0).

3 Delivery and site handling

3.1 The geogrids are delivered to site in rolls with the nominal widths, lengths and weights shown in Table 1. Each roll is wrapped for transit and site protection in blue, high-density polyethylene foil and is labelled with the geogrid grade and identification. The packaging should not be removed until immediately prior to installation.

3.2 The ends of the rolls are sprayed with colour-coded paint, to assist identification on site of the different grades of geogrid (see Table 1) in accordance with BS EN ISO 10320 : 1999.

3.3 Rolls should be stored in clean, dry conditions. When laid horizontally, the rolls may be stacked up to five high. No other loads should be stored on top of the stack. The rolls should be protected from mechanical or chemical damage and extreme temperatures.

3.4 Toxic fumes are given off if the geogrids catch fire and therefore the necessary precautions should be taken, following the instructions given in the material safety data sheet for the product.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out Miragrid GX Geogrids.

Design Considerations

4 General

4.1 When designed in accordance with this Certificate, Miragrid GX Geogrids are satisfactory for the reinforcement to embankments with maximum slope angles of 70°.

4.2 Structural stability is achieved through the frictional interaction of the soil particles and the geogrids and the tensile strength of the geogrids.

4.3 The fill specification and method of placement and compaction, design strength of the reinforcement and length of reinforcement embedded within the compacted fill are the key design factors.

4.4 Prior to the commencement of the work, the designer must satisfy the design approval and certification procedures of the relevant Highway Authority.

4.5 Particular attention should be paid in design to the following issues:

- site preparation and embankment construction
- fill material properties
- drainage
- protection of the product against damage from site traffic and installation equipment
- the stability of existing structures in close proximity
- design of the embankment facing.

4.6 The working drawings should show the correct orientation of the geogrids. Each layer of reinforcement must be continuous in the direction of load, ie without overlaps.

5 Practicability of installation

The product is designed to be installed by trained contractors in accordance with the specifications and construction drawings (see the *Installation* part of this Certificate).

6 Design

Design methodology

6.1 Reinforced soil embankments constructed using Miragrid GX Geogrids should be designed in accordance with BS 8006-1 : 2010 and the *Specification for Highway Works.*

6.2 The typical service life given in Table 7 of BS 8006-1 : 2010 for reinforced soil embankments is 60 years.

Geogrid reinforcement

6.3 In accordance with the methodology set out in BS 8006-1 : 2010, Annex 3, the design strength of the reinforcement (T_D) is calculated as:

$T_D = T_{CR}/f_m$

where:

T_{CR} is the long-term tensile creep rupture strength of the reinforcement at the specified design life and design temperature

f_m is the material safety factor to allow for the strength reducing effects of installation damage, weathering (including exposure to sunlight), chemical and other environmental effects and to allow for the extrapolation of data required to establish the above reduction factors.

6.4 The long-term tensile creep rupture strength (T_{CR}) for each grade of geogrid is calculated using the formula:

$T_{CR} = T_{char}/RF_{CR}$

where:

T_{char} is the characteristic short-term strength of the geogrid taken from Table 2

RF_{CR} is the reduction factor for creep (see section 7).

6.5 The material safety factor (f_m) is calculated as:

$f_m = RF_{ID} \times RF_W \times RF_{CH} \times f_S$

where:

RF_{ID} is the reduction factor for installation damage

RF_W is the reduction factor for weathering, including exposure to ultraviolet light

RF_{CH} is the reduction factor for chemical/environmental effects

f_S is the factor of safety for the extrapolation of data.

6.6 Recommended values for RF_{CR}, RF_{ID}, RF_W, RF_{CH} and f_S are given in sections 7, 8 and 9 of this Certificate. Conditions of use outside the scope for which the reduction factors are defined are not covered by this Certificate and advice should be sought from the Certificate holder.

Soil/geogrid interaction

6.7 There are two modes of interaction between the soil and the reinforcement that need to be considered during the design:

- direct sliding — where the soil above the layer of reinforcement can slide over the reinforcement
- pull out — where the layer of reinforcement pulls out of the soil, after it has mobilized the maximum available bond stresses.

6.8 CIRIA SP123, 1996, sections 4.5 and 4.6 describe the following methods for determining resistance to direct sliding and maximum available bond, to which the appropriate partial factors should be applied in accordance with BS 8006-1 : 2010.

Direct sliding

6.9 The theoretical expression for resistance to direct sliding = $f_{ds} \times \tan \phi'$

where:

f_{ds} is the coefficient of direct sliding

$\tan \phi'$ is the shearing resistance of the soil

ϕ' angle of shearing resistance for the soil.

6.10 The direct sliding coefficient f_{ds} is calculated as:

$f_{ds} = \alpha_s \times (\tan \delta/\tan \phi') + (1 - \alpha_s)$

where:

α_s is the proportion of plane sliding area that is solid

δ is the angle of skin friction, soil on planar reinforcement surface

$\tan \delta/\tan \phi'$ is the coefficient of skin friction between the soil and geogrid material.

6.11 For initial design purposes, the coefficient of skin friction ($\tan \delta/\tan \phi'$) for determining the resistance to direct sliding for the geogrid when buried in compacted frictional fill may be assumed conservatively to be 0.6 for compacted frictional fill ($\phi' = 30°$). Where more precise values are required, for use in design, site-specific testing should be carried out. Soil-specific testing has shown that values of $f_{ds} \geq 1.0$ can be achieved. Values for the proportion of plane sliding area that is solid (α_s) are given in Table 3.

6.12 For detailed design, the resistance to direct sliding should be determined from soil and geogrid specific shear box testing.

Bond

6.13 The theoretical expression for bond shearing resistance = $f_b \times \tan \phi'$

where:

f_b is the bond coefficient.

$\tan \phi'$ is the shearing resistance of the soil

ϕ' angle of shearing resistance for the soil.

Table 3 Soil geogrid interaction parameters for Miragrid GX Geogrids

Grade	α_s [(1)]	Ratio of bearing[(2)] surface to plan area $\alpha_b \times B/2S$
GX 20/20	0.21	0.016
GX 35/20	0.21	0.017
GX 35/35	0.24	0.020
GX 55/30	0.25	0.020
GX 55/55	0.35	0.020
GX 80/30	0.29	0.019
GX 80/80	0.39	0.018
GX 110/30	0.29	0.019
GX 160/30	0.32	0.019
GX 200/30	0.36	0.018
GX 400/30	0.46	0.015

(1) α_s is the proportion of the plane sliding area that is solid and is required for the calculation of the bond coefficient (f_b) and the direct sliding coefficient (f_{ds}) (see sections 6.10 and 6.14).

(2) The ratio of bearing surface to plan area is required to calculate the bond coefficient (f_b) in accordance with CIRIA SP123 : 1996 (see section 6.14):

- α_b is the proportion of the grid width available for bearing
- *B* is the thickness of a transverse member of a grid taking bearing
- *S* is the spacing between transverse members taking bearing.

6.14 The bond coefficient may be calculated as:

$f_b = \alpha_s \times (\tan\delta/\tan\phi') + (\sigma'_b/\sigma'_n) \times (\alpha_b \times B/2S) \times (1/\tan\phi')$

where:

α_s is the proportion of plane sliding area that is solid

$\tan\delta/\tan\phi'$ is the coefficient of skin friction between the soil and geogrid material

σ'_b/σ'_n is the bearing stress ratio

$\alpha_b \times B/2S$ is the ratio of bearing surface to plan area

ϕ' is the angle of shearing resistance in terms of effective stress

δ is the angle of skin friction, soil on planar reinforcement surface

σ'_b is the effective bearing stress on the reinforcement

σ'_n is the normal effective stress.

6.15 For initial design purposes the coefficient of skin friction ($\tan\delta/\tan\phi'$) for the product when buried in frictional fill may be conservatively assumed to be 0.6 for compacted frictional fill (ϕ' = 30°). Where more precise values are required, for use in design, site-specific testing should be carried out. Soil-specific testing has shown that values of f_{ds} ≥1.0 can be achieved. Values for the ratio of bearing surface to plan area ($\alpha_b \times B/2S$) are given in Table 3. Typical values for the bearing stress ratio (σ'_b/σ'_n) are given in CIRIA SP123, 1996, Table 4.1.

6.16 The BBA recommends that site-specific pull-out tests are carried out to confirm the value of bond coefficient (f_b) used in the final design.

Fill material

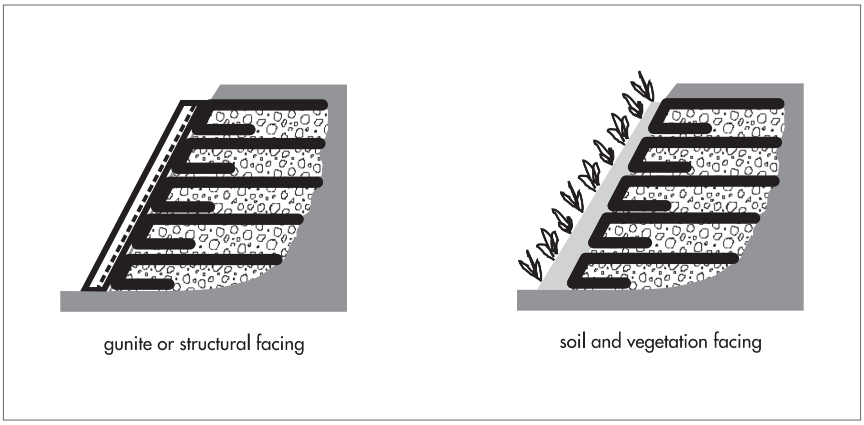
6.17 The designer should specify the relevant properties of fill material deemed acceptable for the purpose of the design. Acceptable materials should meet the requirements of BS 8006-1 : 2010 and the *Specification for Highway Works.*

Facings

6.18 Natural or artificial protection must be provided to the geogrids and fill material to protect the geogrid against damage from ultraviolet light (UV), fire and vandalism, and to protect the fill material from erosion.

6.19 Typical facing details including the geogrid wrapped around the edge of the embankment are shown in Figure 2.

Figure 2 Typical Facing details



6.20 Other types of facing formed from preformed panels, gabions/gabion sacks and other proprietary systems may be used, but are outside the scope of this Certificate. Further guidance is given in BS 8006-1 : 2010.

7 Mechanical properties

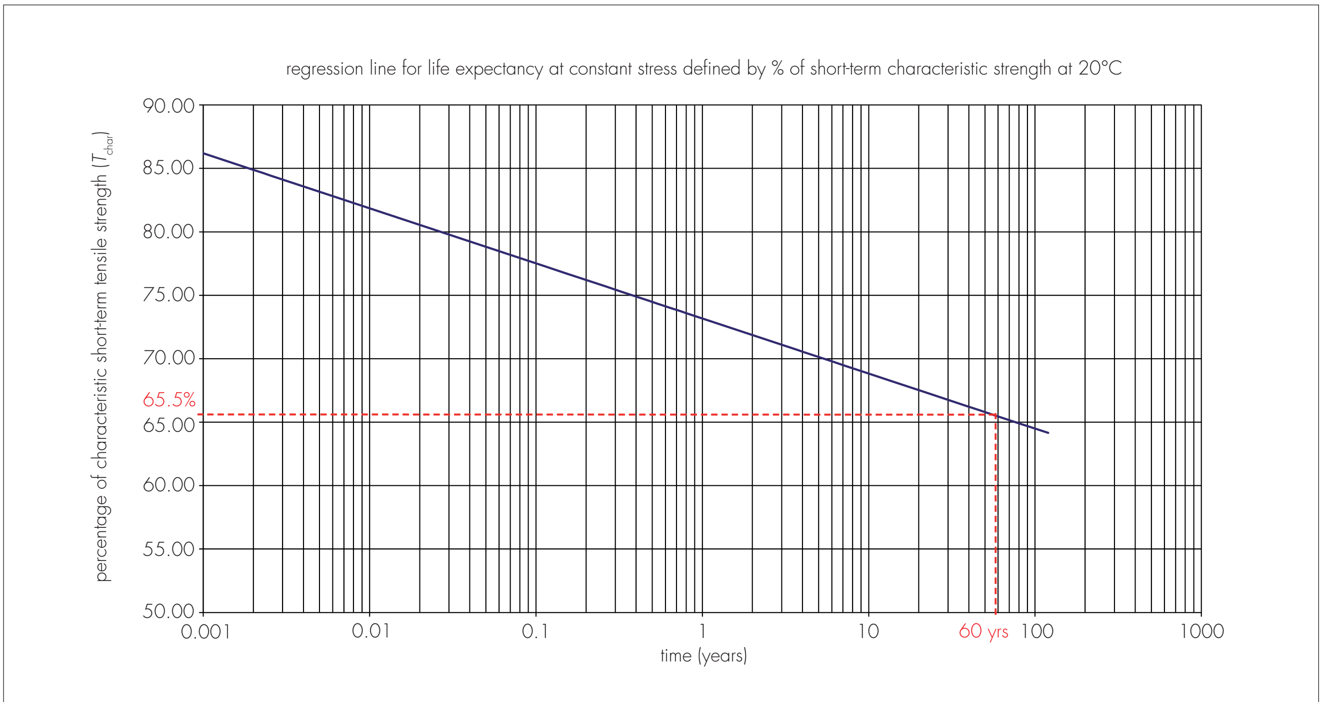
Tensile strength — short-term

7.1 Characteristic short-term tensile strength (T_{char}) and strain at maximum tensile strength values for the product range are given in Table 2.

Tensile strength — long-term

7.2 The long-term creep performance of the geogrids has been determined in accordance with the principles of PD ISO/TR 20432 : 2007 using conventional creep rupture test data up to 10,000 hours and stepped isothermal method (SIM) creep rupture test data up to 650,000 hours. The resultant creep rupture diagram is shown in Figure 3.

Figure 3 Creep rupture diagram — Regression line for the expectancy at constant stress defined by % of characteristic short-term strength at 20°C



7.3 For a 60-year design life and design temperature of 20°C, the long-term tensile strength (T_{CR}) of Miragrid GX Geogrids is 65% of the characteristic short-term tensile strength (T_{char}), giving a long-term creep reduction factor (RF_{CR}) of 1.54.

7.4 For a 120-year design life and design temperature of 20°C, the long-term tensile strength (T_{CR}) of Miragrid GX Geogrids is 64% of characteristic short-term tensile strength (T_{char}) giving a long-term creep reduction factor (RF_{CR}) of 1.56.

Installation damage (RF_{ID})

7.5 To allow for loss of strength owing to mechanical damage that may be sustained during installation, the appropriate value for RF_{ID} should be selected from Table 4. These reduction factors have been established from full-scale installation damage tests using a range of materials whose gradings can be seen in Figure 4. For fills not covered by Table 4, appropriate values of RF_{ID} may be determined from site-specific trials or the engineer may exercise engineering judgement to interpolate between the values given.

Soil type	D_{50} particle size (mm)	D_{90} particle size (mm)	Grade	RF_{ID}
Silty sandy clay	≤ 0.04	≤ 1.4	GX 35/35 GX 110/30 GX 160/30	1.12 — 1.09
Granular material – crushed limestone	≤ 8.5	≤ 26	GX 35/35 GX 110/30 GX 160/30	1.18 1.15 1.08
Recycled material (crushed concrete)	≤ 20	≤ 63	GX 35/35 GX 110/30 GX 160/30	1.35 1.18 1.11
Recycled material (mixed crushed concrete and natural stone)	≤ 20	≤ 79	GX 35/35 GX 110/30 GX 160/30	1.67 1.24 1.14

Table 4 Reduction factors — installation damage (RF_{ID})

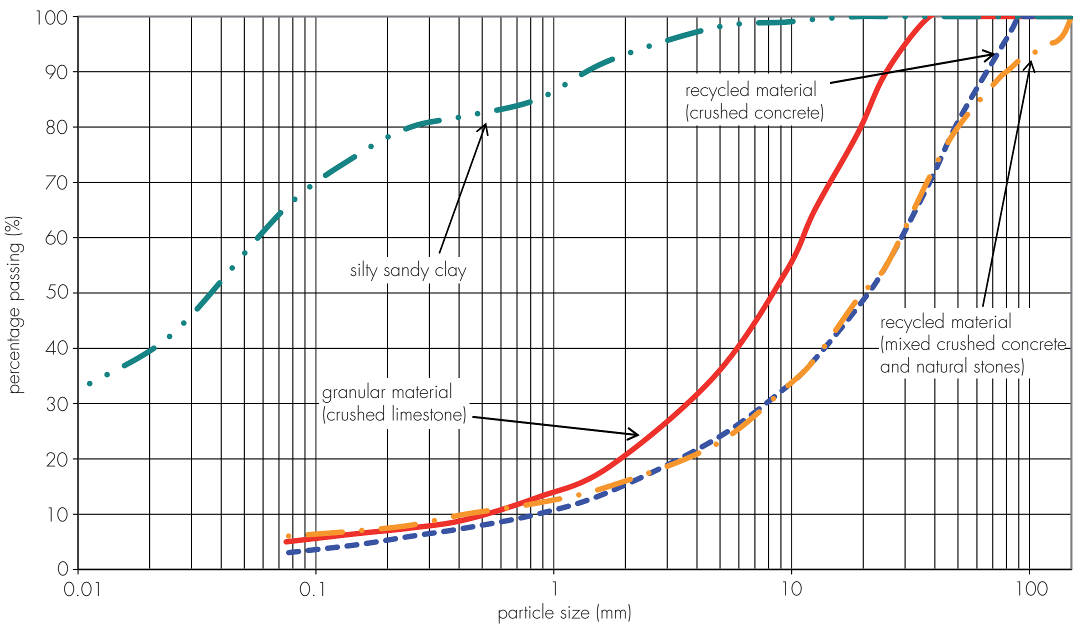
Notes:

1 Min compacted depth above geogrid during damage trials was 320 mm.

2 Compaction plant: Weight of roller: 12400 kg (5830 kg/m).

3 Compaction method: end product specification giving relative density >95%.

Figure 4 Particle size distributions of fills used in installation damage testing



8 Effects of environmental conditions

Weathering (including exposure to sunlight)

8.1 A reduction factor (RF_W) of 1.25 may be used for design provided the geogrids are protected from exposure to sunlight in accordance with the recommendations of this Certificate and provided the periods of exposure are limited to a maximum of two weeks.

Chemical/environmental effects

8.2 To take into account chemical/environmental effects including hydrolysis, resistance to acids and alkaline liquids and biological/microbial attack, the appropriate value of RF_{CH} shown in Table 5 should be used.

Table 5 Reduction factor RF_{CH} for a design temperature of 20°C

Soil pH range	Design life	
	60 years	120 years
2.0 to 4.0	1.20	1.30
4.1 to 9.0	1.09	1.18
9.1 to 10	1.20	1.30

9 Factor of safety for the extrapolation of data (f_s)

9.1 For Miragrid GX geogrids, the factor of safety for the extrapolation of data (f_s) should be taken as:

Table 6 Factors of safety for extrapolation of data

Design life (years)	f_s
60	1.01
120	1.03

9.2 The above values have been calculated in accordance with PD ISO/TR 20432 : 2007, using the R_1 and R_2 values given in Table 7.

Table 7 R_1 and R_2 values for determination of f_s

Factor	Taking account of:	Design life (years)	
		60	120
R_1	Extrapolation of creep rupture data	1.01	1.02
R_2	Extrapolation of chemical data	1.01	1.02

10 Maintenance

As the product is confined within the structure and has suitable durability, maintenance is not required.

11 Durability

When designed and installed in accordance with the requirements of BS 8006-1 : 2010, BS EN 14475 : 2006 and this Certificate, the geogrids will have a service life of up to 120 years, exceeding the typical design life required for reinforced soil embankments.

Installation

12 General

12.1 The construction of reinforced soil embankments incorporating the geogrids should be in accordance with the Certificate holder's installation instructions, BS EN 14475 : 2006 and the Specification for Highway Works.

12.2 Care should be exercised to ensure that the geogrids are laid with the machine (longitudinal) direction parallel to the direction of principal stress. The design drawings should indicate the geogrid orientation (see section 4.6).

13 Procedure

13.1 The geogrid is laid by unrolling the grid to the length required and cutting with a suitable device (eg a sharp knife or scissors). The unrolling of the grid may be carried out manually or mechanically.

13.2 The grids should be laid flat without folds, parallel to each other and with widths in contact. Each reinforcing layer must be continuous in the direction of loading and there should be no overlapping of the grids. Strip misalignment must not exceed 50 mm over a distance of 5 m. Pins or a stretching device may be used to control alignment and also to induce a small pre-stressing load prior to filling.

13.3 Particular care should be taken to ensure that the grids are adequately covered before compaction or trafficking. The direction of compaction should be perpendicular to machine direction. Construction traffic will damage unprotected geogrids.

13.4 Fill materials and the thickness and compaction of the fill should be in accordance with the requirements of the *Manual of Contract Documents for Highway Works* (MCHW), Volume 1, and should be in line with those conditions used to determine the installation damage partial safety factors in the design (see section 7.5).

13.5 The geogrids must be covered with fill within the time specified in the design to prevent degradation caused by ultraviolet light (see section 8.1).

13.6 Facings are positioned as detailed on the engineer's design drawing. Formwork is used to assist in maintaining the shape of the facing.

Technical Investigations

14 Investigations

14.1 The manufacturing process of the Miragrid GX Geogrids for Reinforced Soil Embankments was evaluated, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

14.2 An evaluation was made of data relating to:

- evaluation of long- and short-term tensile properties
- site damage trials and resistance to mechanical damage
- resistance to weathering
- resistance to hydrolysis
- chemical resistance
- resistance to microbiological attack
- soil/geogrid interaction
- installation procedures and typical details.

14.3 Calculations were made to establish the plane sliding area that is solid and the ratio of bearing surface to plane area.

14.4 The practicability of installation and ease of handling were assessed.

Bibliography

BS 8006-1 : 2010 *Code of practice for strengthened/reinforced soils and other fills*

BS EN 13251 : 2001 *Geotextiles and geotextile-related products — Characteristics required for use in earthworks, foundations and retaining structures*

BS EN 14475 : 2006 *Execution of special geotechnical works — Reinforced fill*

BS EN ISO 9001 : 2008 *Quality management systems — Requirements*

BS EN ISO 9864 : 2005 *Geosynthetics — Test method for the determination of mass per unit area of geotextiles and geotextile-related products*

BS EN ISO 10319 : 2008 *Geosynthetics — Wide–width tensile test*

BS EN ISO 10320 : 1999 *Geotextiles and geotextile-related products — Identification on site*

CIRIA SP123 : 1996 *Soil Reinforcement with Geotextiles, Jewell R.A*

ISO/TR 20432 : 2007 *Guidelines for the determination of the long-term strength of geosynthetics for soil reinforcement*

Manual of Contract Documents for Highway Works, Volume 1 *Specification for Highway Works*

Manual of Contract Documents for Highway Works, Volume 2 *Notes for Guidance on the Specification for Highway Works*

15 Conditions

15.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is issued only to the company, firm, organisation or person named on the front page — no other company, firm, organisation or person may hold or claim that this Certificate has been issued to them
- is valid only within the UK
- has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English Law.

15.2 Publications, documents, specifications, legislation, regulations, standards and the like referenced in this Certificate are those that were current and/or deemed relevant by the BBA at the date of issue or reissue of this Certificate.

15.3 This Certificate will remain valid for an unlimited period provided that the product/system and its manufacture and/or fabrication, including all related and relevant parts and processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

15.4 The BBA has used due skill, care and diligence in preparing this Certificate, but no warranty is provided.

15.5 In issuing this Certificate, the BBA is not responsible and is excluded from any liability to any company, firm, organisation or person, for any matters arising directly or indirectly from:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- actual installations of the product/system, including their nature, design, methods, performance, workmanship and maintenance
- any works and constructions in which the product/system is installed, including their nature, design, methods, performance, workmanship and maintenance
- any loss or damage, including personal injury, howsoever caused by the product/system, including its manufacture, supply, installation, use, maintenance and removal
- any claims by the manufacturer relating to CE marking.

15.6 Any information relating to the manufacture, supply, installation, use, maintenance and removal of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used, maintained and removed. It does not purport in any way to restate the requirements of the Health and Safety at Work etc. Act 1974, or of any other statutory, common law or other duty which may exist at the date of issue or reissue of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care.

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