HAPAS

Anderton Concrete Products Ltd
Units 1 and 2
Cosgrove Business Park
Soot Hill
Anderton
Northwich
Cheshire CW9 6AA

Tel: 0333 234 34 34
e-mail: Anderton.structural@ibstock.co.uk
website: www.ibstock.co.uk

HAPAS Certificate
14/H217
Product Sheet 1 Issue 3

ANDERTON CONCRETE RETAINING WALL SYSTEMS

KEYSTONE COMPAC/TW3 RETAINING WALL SYSTEM FOR REINFORCED SOIL RETAINING WALLS AND BRIDGE ABUTMENTS

This Product Sheet(1) is issued by the British Board of Agrément (BBA). The Highways Authorities Product Approval Scheme (HAPAS) is supported by National Highways (NH) (acting on behalf of the Overseeing Organisations of the Department for Transport; Transport Scotland; the Welsh Government; and the Department for Infrastructure, Northern Ireland), the Association of Directors of Environment, Economy, Planning and Transport (ADEPT), the Local Government Technical Advisers Group and industry bodies.

(1) Hereinafter referred to as 'Certificate'.

This Certificate relates to the Keystone(1) Compac/TW3 Retaining Wall System(2) for Reinforced Soil Retaining Walls and Bridge Abutments, comprising modular concrete block facing units, Tensar RE500 geogrids, high density polyethylene (HDPE) polymeric connectors, glass fibre reinforced (GRP) dowels and compacted fill material. The system is for use in reinforced soil retaining walls and bridge abutments, in accordance with the *Manual of Contract Documents for Highway Works* (MCHW), Volume 1 *Specification for Highway Works* (SHW), Series 600, designated Standards BS EN 13251 : 2016, BS 8006-1 : 2010, BS EN 14475 : 2006, BS 8500-1 : 2015, BS EN 771-3 : 2011, BS EN 1996-1-1: 2022 and BS EN 12878 : 2014, the National Concrete Masonry Association *Design Manual for Segmental Retaining Walls* (Second edition 1977) and BRE Special Digest 1 : 2005.

(1) Keystone is a registered trademark.

(2) In the UK, the Keystone Compac/TW3 Retaining Wall System may also be referred to as the TensarTech TW3 System.

The BBA has awarded this Certificate to the company named above for the system described herein. This system has been assessed by the BBA as complying with the requirements of the BBA HAPAS Certification Scheme according to the assessments set out in this Certificate.

On behalf of the British Board of Agrément

Date of Third issue: 21 February 2025
Originally certificated on 26 June 2014

Hardy Giesler
Chief Executive Officer

This BBA HAPAS Certificate is issued under the BBA's accreditation to ISO/IEC 17065 (UKAS accredited Certification Body Number 0113).

Clauses marked † are additional information outside the scope of accreditation.

Readers MUST check the validity and latest issue number of this BBA HAPAS Certificate by referring to the BBA website or contacting the BBA directly.

The Certificate should be read in full as it may be misleading to read clauses in isolation.

Any photographs are for illustrative purposes only, do not constitute advice and should not be relied upon.

British Board of Agrément
1st Floor, Building 3, Hatters Lane
Croxley Park, Watford
Herts WD18 8YG
tel: 01923 665300
clientservices@bbacerts.co.uk
www.bbacerts.co.uk

1 Product Description

1.1 The Certificate holder specifies the product under assessment, the Keystone Compac/TW3 Retaining Wall System for Reinforced Soil Retaining Walls and Bridge Abutments, comprising modular concrete block facing units, Tensar RE500 geogrids, HDPE polymeric connectors, glass fibre reinforced (GRP) dowels and compacted fill material, for use in reinforced soil retaining walls and bridge abutments, in accordance with the MCHW(1), Volume 1 (SHW), Series 600, and designated Standards BS EN 13251 : 2016, BS 8006-1 : 2010, BS EN 14475 : 2006, BS 8500-1 : 2015, BS EN 771-3 : 2011, BS EN 1996-1-1: 2022 and BS EN 12878 : 2014, the National Concrete Masonry Association *Design Manual for Segmental Retaining Walls* (Second edition 1977) and BRE Special Digest 1 : 2005.

(1) The MCHW is operated by National Highways (NH) (acting on behalf of the Overseeing Organisations of the Department for Transport; Transport Scotland; the Welsh Government; and the Department for Infrastructure, Northern Ireland).

Concrete block facing units

1.2 The modular concrete block facing units covered by this Certificate are described in Table 1 and shown in Figure 1. All units are manufactured to the same specification. Non-structural coping units are also available but are outside the scope of this Certificate.

Figure 1 Keystone COMPAC/TW3 modular concrete block facing units

Table 1 Keystone COMPAC/TW3 modular concrete block facing units

Block type	Split faced	Rock faced	Smooth faced	Pitched face
Description/use	Facing unit	Facing unit	Facing unit	Facing unit
Face finish	split	split	smooth	split
Dimensions (L x W x H) (mm)	455 x 300 x 200	455 x 300 x 200	455 x 300 x 200	455 x 300 x 200
Nominal weight (kg)	40	39.5	40	39.5

Geogrids

1.3 The following grades of Tensar RE500 geogrids(1) have been assessed by the BBA for use with the system:

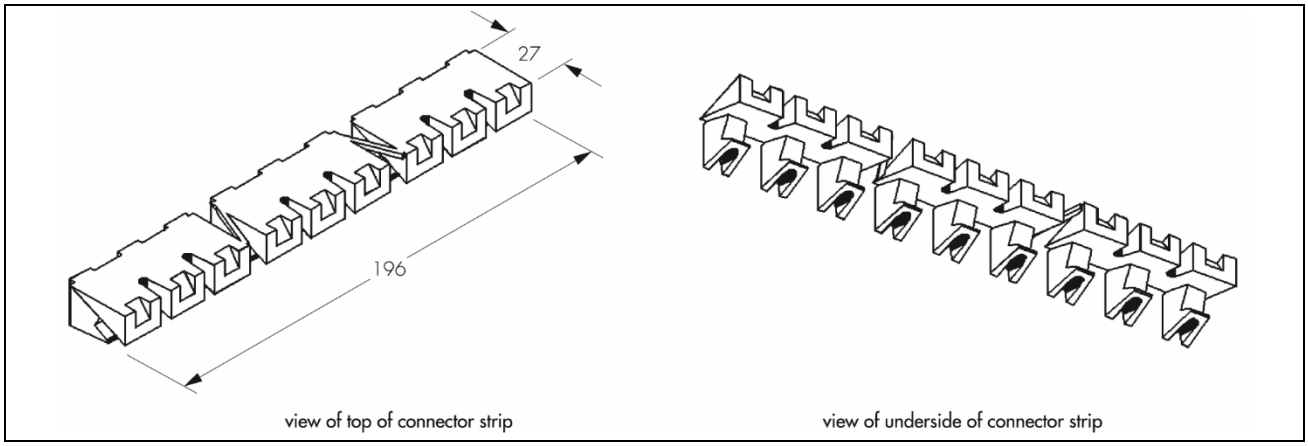
- Tensar RE520
- Tensar RE540
- Tensar RE560
- Tensar RE580.

(1) Full product details are given in BBA Certificate 13/H201, Product Sheet 1.

Polymeric connectors

1.4 The polymeric connectors are manufactured from HDPE to one specification, to the profile shown in Figure 2.

Figure 2 Polymeric connectors



Pultruded GRP dowels

1.5 The dowels are 133 mm in length with a diameter of 12.7 mm, yellow or white in colour, and manufactured from pultruded glass reinforced plastic to one specification.

2 Requirements

Requirements for the system are outlined in the BBA HAPAS Certification Scheme and Technical Specifications Documents, and have been established from the following specification documents:

- the MCHW, Volume 1 (SHW), Series 600
- BS EN 13251 : 2016
- BS 8006-1 : 2010
- BS EN 14475 : 2006
- BS 8500-1 : 2015
- BS EN 771-3 : 2011
- BS EN 1996-1-1 : 2022
- the National Concrete Masonry Association *Design Manual for Segmental Retaining Walls* (Second edition 1977)
- BRE Special Digest 1 : 2005
- BS EN 12878 : 2014.

3 Summary of Product Assessment

The system was assessed on the basis of the following characteristics in accordance with HAPAS requirements.

The characteristics given in Tables 2 to 7 have been declared by the manufacturer.

3.1 Essential characteristics

Table 2 Essential characteristics for the Keystone Compac/TW3 Retaining Wall System

Product assessed	Assessment method	Requirement	Result
Keystone Compac/TW3 modular concrete block facing units	BS 8500-1 : 2015	Exposure Class XF2	Pass
		Cement ≥ 340 kg·m^{-3}	Pass
		water/cement ratio ≤ 0.55	Pass

3.2 Compressive strength

Table 3 Compressive strength characteristics for Keystone Compac/TW3 Retaining Wall System

Product assessed	Assessment method	Requirement	Result
Keystone Compac/TW3 modular concrete block facing units	BS 8500-1 : 2015 Compressive strength to BS EN 772-1 : 2011	Concrete Strength at 28 days ≥ 40 $N \cdot mm^{-2}$	Pass

3.3 Gross dry density

Table 4 Gross dry density characteristics for Keystone Compac/TW3 Retaining Wall System

Product assessed	Assessment method	Requirement	Result
Keystone Compac/TW3 modular concrete block facing units	Gross Dry Density to BS EN 772-13 : 2000	2100 $kg \cdot m^{-3}$	Pass

3.4 Dimensions

Table 5 Dimensions characteristics for Keystone Compac/TW3 Retaining Wall System

Product assessed	Assessment method	Requirement	Result
Keystone Compac/TW3 Retaining Wall System	Dimensions and dimensional tolerances to BS EN 771-3 : 2011	As shown in Table 1 Category D2	Pass

3.5 Configuration

Table 6 Configuration characteristics for Keystone Compac/TW3 Retaining Wall System

Product assessed	Assessment method	Requirement	Result
Keystone Compac/TW3 Retaining Wall System	Configuration to EN 1996-1-1 : 2022	Group 1	Pass

3.6 Reaction to Fire

Table 7 Fire class characteristics for Keystone Compac/TW3 Retaining Wall System

Product assessed	Assessment method	Requirement	Result
Keystone Compac/TW3 Retaining Wall System	Fire classification assessment	Euroclass A1	Pass

3.7 Long-term connection strength for Tensar RE500 Geogrids

Table 8 Long-Term Connection Strength for Tensar RE500 Geogrids (T_{conn})

Product assessed	Assessment method	Requirement	Result[2]
RE520	Long-term connection strength values (T_{conn}) for the system have been derived from short-term tests in line with the National Concrete Masonry Association Design Manual for Segmental Retaining Walls (Second edition 1977) and ASTM D6638-11	T_{CR}[1] = 27.3 kN·m^{-1} Block height above geogrid reinforcement =	
		1.0 – 1.8 m	T_{conn} = 17.3 kN·m^{-1}
		1.9 – 2.7 m	T_{conn} = 20.0 kN·m^{-1}
		2.8 – 4.5 m	T_{conn} = 21.0 kN·m^{-1}
		4.6 – 6.0 m	T_{conn} = 21.3 kN·m^{-1}
		6.1 – 9.1 m	T_{conn} = 23.0 kN·m^{-1}
RE540		T_{CR}[1] = 33.4 kN·m^{-1} Block height above geogrid reinforcement =	
		1.4 – 2.3 m	Tconn = 27.5 kN·m^{-1}
		2.4 – 3.8 m	Tconn = 28.2 kN·m^{-1}
		3.9 – 8.0 m	Tconn = 26.7 kN·m^{-1}
		8.1 – 10.0 m	Tconn = 24.3 kN·m^{-1}
RE560		T_{CR}[1] = 45.9 kN·m^{-1} Block height above geogrid reinforcement =	
		1.0 – 3.0 m	Tconn = 36.9 kN·m^{-1}
		3.1 – 6.9 m	Tconn = 37.9 kN·m^{-1}
		7.0 – 8.6 m	Tconn = 37.0 kN·m^{-1}
		8.7 – 10.0 m	Tconn = 32.2 kN·m^{-1}
RE580		T_{CR}[1] = 71.1 kN·m^{-1} Block height above geogrid reinforcement =	
		2.0 – 3.9	Tconn = 64.4 kN·m^{-1}
		4.0 – 7.7	Tconn = 63.8 kN·m^{-1}
		7.8 – 9.5	Tconn = 62.7 kN·m^{-1}
		9.6 – 10.0	Tconn = 58.4 kN·m^{-1}

(1) For a design life of 120 years and a design temperature of 10°C.

(2) For a design life of 120 years and a design temperature of 10°C.

3.8 Material factor for determination of ultimate limit state (ULS) design connection strength T_{Dconn}

The following reduction factors and factors of safety (see Table 9) should be used to determine the material factor (f_m)required for calculation of the ULS design connection strength (T_{Dconn}).

Table 9 Reduction factors for determination of T_{Dconn} for TensarTech Keystone Compac/TW3 Retaining Wall System

Product assessed	Design aspect	Requirement	Outcome[1]
TensarTech Keystone Compac/TW3 Retaining Wall System	Installation damage	Values achieved	fR,ID[2] = 1.00
	Weathering	Periods of exposure are limited to a maximum of 1 month	fR,W = 1.00
	Chemical/Environmental	pH range of 2 to 4	fR,CH = 1.05
		pH range of 4 to 12.5	fR,CH = 1.00
	Extrapolation of data	60 Years' design Life Design Soil Temperature 20°C	Fs = 1.00
		120 Years' design Life Design Soil Temperature 20°C	fs = 1.00

(1) For a design life of 120 years and subject to installation conditions

(2) A value of fR,ID = 1.0 can be used for all geogrid grades as installation damage is generally taken into account during the connection strength tests.

3.9 All pigments used for the colouration of the concrete block facing units comply with BS EN 12878 : 2014.

3.10 Reuse and recyclability

The concrete block facing units can be crushed and re-used as aggregate. The compacted fill material can also be reused.

3.11 Durability

3.11.1 When designed and installed in accordance with this Certificate, the system will have adequate durability for the required 120-year design life of a retaining wall and bridge abutment in conditions encountered in the UK.

3.11.2 Where the units are to be embedded in potentially aggressive soils, the guidance given in BS 8500-1 : 2015 and BRE Special Digest 1 : 2005 should be followed.

3.11.3 In accordance with BS 8006-1 : 2010, Annex B, the required design life for permanent walls and bridge abutments is 120 years.

4 Summary of Process Assessment

Manufacturing process and quality control	Complies with HAPAS requirements
Delivery and site handling	Complies with HAPAS requirements
Installation	Complies with HAPAS requirements

4.1 Manufacture

4.1.1 The BBA has undertaken the following tasks for the assessment of system manufacture and has established that the manufacture complies with BBA HAPAS Certification Scheme requirements:

- the BBA has recorded and evaluated the manufacturer's documentation of the methods adopted for quality control procedures and product testing against HAPAS requirements
- the BBA has assessed the quality control operated over batches of incoming materials and formulations against HAPAS Requirements
- the BBA has evaluated the process for management of non-conforming work
- the BBA has audited the production process and verified that it is in accordance with the documented process
- the BBA has checked that equipment has been properly tested and calibrated.

4.1.2 The BBA has undertaken to review 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.

† 4.1.3 The management system of the manufacturer has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2015 by BSI (Certificate FM 559191).

4.1.4 The concrete block facing units are manufactured to an agreed specification by the Certificate holder. The units are moulded on block machines and compacted using mechanical vibratory compaction. Units with split face finishes are moulded in pairs and split after drying. Smooth finish units are moulded in individual moulds.

4.1.5 The geogrids are manufactured by Tensar International Limited. Further details are given in BBA Certificate 13/H201, Product Sheet 1.

4.1.6 The polymeric connectors are injection moulded from HDPE to one agreed specification by approved manufacturers.

4.1.7 The GRP dowels are manufactured by pultrusion to achieve the required short- and long-term performance by approved manufacturers.

4.2 Delivery and site handling

† 4.2.1 The Certificate holder states that the concrete block facing units are delivered to site, shrink-wrapped on pallets. They carry a manufacturer's label or marking identifying the product type and batch code. Pallets should not be stacked more than two high.

4.2.2 To achieve the performance described in this Certificate, delivery and site handing must be performed in accordance with the Certificate holder's instructions and this Certificate, including:

- to prevent damage, care should be taken in transit and handling. During prolonged periods of storage on site the units should remain covered on pallets
- the geogrids should be handled and stored as detailed in BBA Certificate 13/H201, Product Sheet 1
- the polymeric connectors are delivered to site, packaged in multiples of 250 units. The packages are labelled identifying the manufacturer, product type and batch code. The connectors should remain in their packaging until ready for use as any damage or dirt accumulation will compromise the structural integrity of the connection
- the GRP dowels are delivered to site in boxes. Care should be taken in storage, transit and handling on site.

4.3 Design

4.3.1 When designed and installed in accordance with this Certificate, the system is suitable for the construction of reinforced soil retaining walls and bridge abutments as constrained by the long-term tensile strength at each layer of reinforcement, which satisfies the ULS and the post construction creep strain serviceability limit state (SLS) design criteria defined in BS 8006-1 : 2010, and not exceeding the connection strength at the face as set out in section 4.3.16 of this Certificate, ie $T_j \leq T_{Dconn}$.

4.3.2 Structural stability of the system is achieved through:

- interface shear capacity between adjacent rows of units
- the connection strength between the units and geogrid layers at each layer of geogrid
- the tensile strength of the geogrids, and
- the embedment and resistance to sliding and pull-out of the geogrids from the fill material.

4.3.3 The connection between the geogrids and concrete block facing units is formed using the polymeric connectors (see Figure 3).

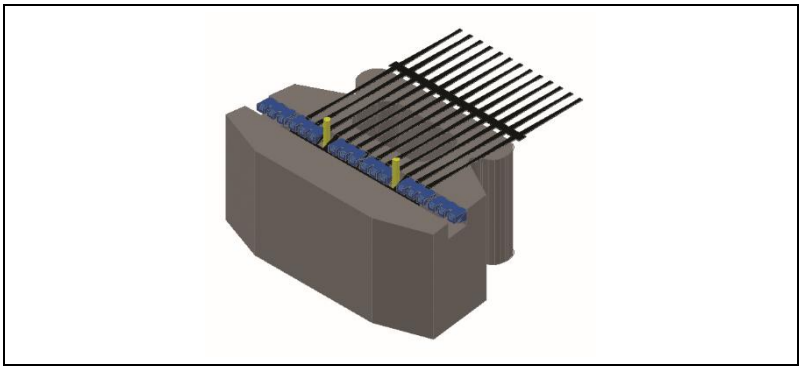
4.3.4 To prevent interface shear, all units must be interconnected with the GRP dowels, whether or not a reinforcing layer is to be used.

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

4.3.6 If required, the system must be assessed for loads caused by vehicle collision when supporting parapets in accordance with BS 8006-1 : 2010, on a case specific basis.

4.3.7 Reinforced soil structures constructed using the system should be protected with suitable barriers, to protect the structure against potential damage from vehicle impact and vehicle fires.

Figure 3 Method of connecting geogrid to concrete block facing unit



4.3.8 In addition to the factors covered in section 4.3.1 to 4.3.7, attention must also be paid in design to:

- site preparation
- fill material properties
- the specification for placing and compaction of the fill material
- drainage behind the wall
- protection of the geogrids against damage during installation.

4.3.9 It is considered that with correct design and workmanship, and by following the recommendations of this Certificate, normally accepted tolerances of line and level for the construction of retaining walls as defined in BS 8006-1 : 2010, Table 18, can be achieved. However, where the alignment of the vertical face is critical, consideration may be given to providing a brickwork skin, or similar, to the units (outside the scope of this Certificate).

4.3.10 Particular attention should be paid to changes in direction of walls where overlapping of the geogrids may occur. BS 8006-1 : 2010 also gives guidance on typical layout plans for the geogrids (reinforcing elements) in bridge abutments.

Design methodology

4.3.11 Reinforced soil retaining walls and bridge abutments constructed using the system must be designed in accordance with BS 8006-1 : 2010 and the MCHW, Volume 1.

4.3.12 To evaluate the overall stability of the system, it is necessary to consider:

- the design strength and length of embedment of the geogrid (for the ULS and SLS)
- the length of embedment of the geogrid within the compacted fill material
- the connection strength between the geogrid and concrete block facing units
- the interface shear capacity of the concrete block facing units between layers of geogrid reinforcement.

Design strength of geogrids

4.3.13 The designer must carry out design checks to ensure that the geogrids have adequate long-term tensile strength at each layer of reinforcement, to satisfy ULS and the post construction creep strain SLS design criteria defined in BS 8006-1 : 2010. Short- and long-term tensile strength values and material reduction factors for use in the design of the geogrids are given in BBA Certificate 13/H201, Product Sheet 1.

4.3.14 The design tensile strength of reinforcement (T_D), ULS ($T_{D(ULS)}$), SLS ($T_{D(SLS)}$), the long-term tensile creep rupture strength (T_{CR}), extrapolated tensile load based on creep strain at the end of the design life (T_{CS}) and the material safety factor (f_m) is calculated in accordance with the methodology set out in BS 8006-1 : 2010.

Length of embedment of geogrid

4.3.15 The designer must carry out checks to ensure that the geogrids have adequate length of embedment within the compacted fill material to prevent pull-out. Design coefficients for the assessment of soil/geogrid interaction and pull-out are given in BBA Certificate 13/H201, Product Sheet 1.

Connection strength between the geogrids and concrete block facing units

4.3.16 The design connection strength between the geogrids and concrete block facing units (T_{Dconn}) should be determined for the ULS and checks should be made to ensure that it is not exceeded by the design load (Tj) at each level, ie Ti $\leq T_{Dconn}$. Particular care should be taken during the design of bridge abutments to ensure that adequate reinforcement is provided, and adequate connection strengths are achieved at the top of the wall and in front of bank seats. Refer to sections 3.7 and 3.8.

4.3.17 The minimum value of load factor used in determining the design load should be 1.5 for all designs using the system.

Interface shear capacity between concrete block facing units

4.3.18 The system has adequate interface shear capacity when designed and installed in accordance with this Certificate.

Specification of fill material

4.3.19 The designer should specify the relevant properties of the fill material for the reinforced soil structure deemed acceptable for the purposes of the design. Acceptable materials should meet the requirements of BS 8006-1 : 2010 and the MCHW, Volume 1, Series 600.

Mechanical properties — geogrids

4.3.20 Short- and long-term strength values and reduction factors required for design of the geogrids are given in BBA Certificate 13/H201, Product Sheet 1. These include:

- characteristic short-term tensile strengths (T_{char})
- long-term creep rupture strengths (T_{CR})
- maximum permissible loads to limit post-construction creep strain (T_{CS})
- reduction factors for installation damage (fR,ID), weathering (fR,W) and environmental degradation (fR,CH)
- factors of safety for extrapolation of data (fs)
- coefficients for the assessment of soil/geogrid interaction and resistance to pull-out.

4.4 Installation

4.4.1 The Certificate holder's instructions for installation of the system were confirmed as meeting the BBA HAPAS Certification Scheme requirements.

† 4.4.2 To achieve the performance described in this Certificate, installation of the system should also comply with the requirements of BS 8006-1 : 2010 and BS EN 14475 : 2006.

† 4.4.3 The Certificate holder's instructions advise the following:

4.4.3.1 The formation level is prepared and a suitable concrete foundation is laid to the correct level for the first course of units.

4.4.3.2 The first course of units should always be laid on a mortar bed, or bedded into the fresh concrete, to achieve the required accuracy in line and level. The units should be set out to achieve 305 mm from pin to pin on adjacent units,

thereby creating a 2 mm gap between adjacent units. The units should be lifted and located by two people using appropriate lifting equipment.

4.4.3.3 The GRP dowels should be securely inserted to over half their length into the appropriate holes in the units (see Figure 1). All units must be inter-connected with GRP dowels, whether or not a geogrid layer is to be inserted.

4.4.3.4 The units should be laid until the required level of the first layer of geogrid. All voids, in between and immediately behind the units are filled with the granular fill material. The granular fill material must be hand tamped to avoid block movement. The drainage zone should extend a minimum of 300 mm behind the units. Backfill may then be placed and compacted to the level of the first layer of geogrid. The Granular material to all voids must be a crushed, coarse aggregate graded 4/20 in accordance with BS EN 12620 : 2002 or BS 8006-1 : 2010.

4.4.3.5 Fill material is placed to a depth not less than 150 mm before each pass of the compaction plant. The material is placed by mechanical plant but to avoid excessive movement of the wall facing, heavy compaction plant should not be employed within two metres of the units. Outside this area, a depth of fill not less than 150 mm for each pass should be carried out to suit the compaction plant used (see the MCHW, Volume 1, Clause 622.7). Installation and compaction of Tensar RE500 geogrids should be as described in BBA Certificate 13/H201, Product Sheet 1.

4.4.3.6 In general, the compacted fill material should be level to receive the geogrid, and the units swept to remove all debris. A suitable length of geogrid should be cut from the roll and any protruding ribs trimmed back to within 10 mm of the transverse bar. The prepared end of the geogrid is placed over the rebate in the unit and the polymeric connectors located around the transverse bar. Each aperture of the geogrid must be covered by a polymeric connector.

4.4.3.7 The assembly is positioned neatly into the rebate of the unit and pushed down firmly. The next course of units is placed over the GRP dowels, locating the kidney-shaped recesses over the pins, and pushed towards the front of the structure until it makes full contact with both pins. The use of plastic shims to ensure the units are level is recommended.

4.4.3.8 Depending upon the design, up to three courses of units may be laid before inserting a further layer of geogrid (ie 600 mm maximum vertical spacing).

4.4.3.9 The geogrid should be lightly tensioned using the tensioning beam supplied, so that the polymeric connectors are up against the rear of the rebate.

4.4.3.10 The procedure is repeated until the required level for a coping facing unit is reached.

4.4.3.11 Connection of lengths of geogrid (other than at the units) is carried out using Tensar Bodkins as described and detailed in BBA Certificate 13/H201, Product Sheet 1.

4.4.3.12 To achieve the performance described in this certificate, the product must be installed by competent ground engineering contractors, familiar with these type of products in accordance with the specifications and construction drawings.

4.4 Maintenance

The exposed faces of the concrete block facing units may require periodic maintenance, to remove dirt build up, mould and moss growth. All other components of the system are confined within the wall and/or fill and do not require maintenance.

5 Fulfilment of Requirements

5.1 The conclusion of this BBA assessment is that the Keystone Compac/TW3 Retaining Wall System for Reinforced Soil Retaining Walls and Bridge Abutments, when used in accordance with the provisions of this Certificate, complies with the BBA HAPAS Certification Scheme requirements.

5.2 In order for the system to continue to meet Scheme requirements, it must be installed, used and maintained as per the Certificate holder's instructions and as detailed in the Certificate.

6 Validity of Certificate

Continuing validity of this Certificate is dependent on the following factors:

- continuing compliance with product or process requirements, as described in the HAPAS Scheme document, and the specification documents referred to therein
- ongoing BBA surveillance of factory production control, to verify that the specifications and quality control being operated by the manufacturer are being maintained
- formal triennial Review of the Certificate, and Reissue for required technical or non-technical updates
- compliance with ongoing Certificate obligations by the Certificate holder and manufacturer(s).

†7 Additional Regulations

Construction (Design and Management) Regulations 2015
Construction (Design and Management) Regulations (Northern Ireland) 2016

Information in this Certificate may assist the client, designer (including Principal Designer) and contractor (including Principal Contractor) to address their obligations under these Regulations.

CE marking

The Certificate holder has taken the responsibility of CE marking the modular concrete block facing units in accordance with harmonised European Standard EN 771-3 : 2011. The supplier of the geogrids has taken the responsibility of CE marking the geogrids in accordance with harmonised European Standard EN 13251 : 2016.

8 Bibliography

ASTM D6638-11 *Standard Test Method for Determining Connection Strength Between Geosynthetic Reinforcement and Segmental Concrete Units (Modular Concrete Blocks)*

BRE Special Digest 1 : 2005 *Concrete in aggressive ground : Part C Assessing the aggressive chemical environment*

BS 8006-1 : 2010 + A1 : 2016 *Code of practice for strengthened/reinforced soils and other fills*

BS 8500-1 : 2015 + A2 : 2019 *Concrete — Complementary British Standard to BS EN 206 — Method of specifying and guidance for the specifier*

BS EN 771-3 : 2011 + A1 : 2015 *Specification for masonry units Aggregate concrete masonry units (dense and lightweight aggregates)*

BS EN 772-1 : 2011 + A1 : 2015 *Methods of test for masonry units — Determination of compressive strength*
BS EN 772-13 : 2000 *Methods of test for masonry units — Determination of net and gross dry density of masonry units (except for natural stone)*
BS EN 12620 : 2002 + A1 : *2008 Aggregates for concrete*

BS EN 1996-1-1 : 2022 *Eurocode 6 — Design of masonry structures — General rules for reinforced and unreinforced masonry structures*

BS EN 12878 : 2014 *Pigments for the colouring of building materials based on cement and/or lime — Specifications and methods of test*

BS EN 13251 : 2016 *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 : 2015 *Quality management systems — Requirements*

Manual of Contract Documents for Highway Works (MCHW), Volume 1 *Specification for Highway Works* (SHW), Series 600

National Concrete Masonry Association Design Manual for Segmental Retaining Walls (Second edition 1977) – Last amendments issued May 2018

9 Conditions of Certification

9.1 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.

9.2 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.

9.3 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.

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

9.5 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 UKCA marking and CE marking.

9.6 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.

British Board of Agrément
1st Floor, Building 3, Hatters Lane
Croxley Park, Watford
Herts WD18 8YG
tel: 01923 665300
clientservices@bbacerts.co.uk
www.bbacerts.co.uk