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Agrément Certificate

02/3975

Product Sheet 1 Issue 4

STYRENE COMPRESSIBLE FILL

STYLITE COMPRESSIVE CLAYFILL LOW DENSITY EXPANDED POLYSTYRENE BOARDS

This Agrément Certificate Product Sheet⁽¹⁾ relates to Stylite Compressive Clayfill Low Density Expanded Polystyrene Boards, for use below concrete ground beams in piled foundation construction and at the vertical face of deep trench foundations to reduce the pressure exerted on the concrete by expansion of clay soils (clay heave) during the life of the structure. The products must not be used under ground floor slabs.

(1) Hereinafter referred to as 'Certificate'.

The assessment includes

Product factors:

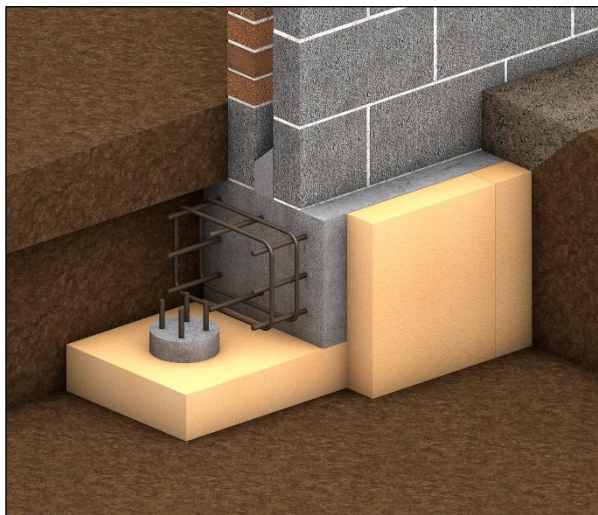
- compliance with Building Regulations
- compliance with additional regulatory or non-regulatory information where applicable
- evaluation against technical specifications
- assessment criteria and technical investigations
- uses and design considerations

Process factors:

- compliance with Scheme requirements
- installation, delivery, handling and storage
- production and quality controls
- maintenance and repair

Ongoing contractual Scheme elements†:

- regular assessment of production
- formal 3-yearly review



KEY FACTORS ASSESSED

- Section 1. Mechanical resistance and stability
- Section 2. Safety in case of fire
- Section 3. Hygiene, health and the environment
- Section 4. Safety and accessibility in use
- Section 5. Protection against noise
- Section 6. Energy economy and heat retention
- Section 7. Sustainable use of natural resources
- Section 8. Durability

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 Fourth issue: 13 December 2024

Originally certified on 23 December 2002


Hardy Giesler
Chief Executive Officer

This BBA Agrément Certificate is issued under the BBA's Inspection Body accreditation to ISO/IEC 17020. Sections marked with † are not issued under accreditation.

The BBA is a UKAS accredited Inspection Body (No. 4345), Certification Body (No. 0113) and Testing Laboratory (No. 0357).

Readers MUST check that this is the latest issue of this Agrément Certificate by either 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.

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SUMMARY OF ASSESSMENT AND COMPLIANCE

This section provides a summary of the assessment conclusions; readers should refer to the later sections of this Certificate for information about the assessments carried out.

Compliance with Regulations

Having assessed the key factors, the opinion of the BBA is that Stylite Compressive Clayfill Low Density Expanded Polystyrene Boards, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations:



The Building Regulations 2010 (England and Wales) (as amended)

Requirement:	A2	Ground movement
Comment:		The products prevent expansion of clay soils impairing the stability of the structure. See section 1 of this Certificate.
Regulation:	7(1)	Materials and workmanship
Comment:		The products are acceptable. See sections 8 and 9 of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Fitness and durability of materials and workmanship
Comment:		The products are acceptable. See sections 8 and 9 of this Certificate.
Regulation:	9	Building standards – construction
Standard:	1.1(b)	Structure
Comment:		The products can contribute to satisfying the relevant requirements of this Standard, with reference to clause 1.1.4 ⁽¹⁾⁽²⁾ . See section 1 of this Certificate.
Standard:	7.1(a)	Statement of sustainability
Comment:		The products can contribute to satisfying the relevant requirements of Regulation 9, Standards 1 to 6, and therefore will contribute to a construction meeting at least a bronze level of sustainability as defined in this Standard.
Regulation:	12	Building standards – conversion
Comment:		All comments given for the products under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1 ⁽¹⁾⁽²⁾ and Schedule 6 ⁽¹⁾⁽²⁾ .

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).



The Building Regulations (Northern Ireland) 2012 (as amended)

Regulation:	23(1)(a)(i)	Fitness of materials and workmanship
Comment:	(iii)(b)(i)	The products are acceptable. See sections 8 and 9 of this Certificate.
Regulation:	30	Stability
Comment:		The products can contribute to satisfying the relevant requirements of this Regulation. See section 1 of this Certificate.

Additional Information

NHBC Standards 2024

In the opinion of the BBA, Stylite Compressive Clayfill Low Density Expanded Polystyrene Boards, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards*, Chapters 4.2 *Building near trees*, 4.3 *Strip and trench fill foundations* and 4.4 *Raft, pile, pier and beam foundations*.

Fulfilment of Requirements

The BBA has judged Stylite Compressive Clayfill Low Density Expanded Polystyrene Boards to be satisfactory for use as described in this Certificate. The products have been assessed as low density expanded polystyrene boards, for use below concrete ground beams in piled foundation construction and at the vertical face of deep trench foundations to reduce the pressure exerted on the concrete by expansion of clay soils (clay heave) during the life of the structure.

ASSESSMENT

Product description and intended use

The Certificate holder provided the following description for the products under assessment. Stylite Compressive Clayfill Low Density Expanded Polystyrene Boards are low-density expanded polystyrene (EPS) boards coloured orange.

The boards are available in the standard sizes shown in Table 1.

Table 1 Board sizes (in mm)

Thickness	Length ⁽¹⁾	Width ⁽¹⁾
50	2000 or 2400	1000 or 1200
100	2000 or 2400	1000 or 1200
150	2000 or 2400	1000 or 1200
200	2000 or 2400	1000 or 1200

(1) Non-standard sizes are available to special order.

Product assessment – key factors

The products were assessed for the following key factors, and the outcome of the assessment is shown below. Conclusions relating to the Building Regulations apply to the whole of the UK unless otherwise stated.

1 Mechanical resistance and stability

Data were assessed for the following characteristic.

1.1 Behaviour under loading

1.1.1 The products were tested to establish its compressive stress-strain relationship, to assess the compressibility of the products. The result is given in Table 2.

Table 2 Compression in the Stylite Compressive Clayfill

Products assessed	Assessment method	Requirement	Results
Stylite Compressive Clayfill Low Density Expanded Polystyrene Boards	BBA Method	Compressibility of the products. The stress-strain relationship of the products up to 40 kN·m ⁻² pressure is defined	Pass

1.1.2 On the basis of data assessed, the products have sufficient compressibility to protect the underside or side of foundations from the effect of clay heave (see also Figures 1 and 2).

1.1.3 The products were tested to establish their resistance to construction loads, as may be expected during the installation of the products and the subsequent over-concreting. The test result is given in Table 3.

Table 3 Load capacity of the Stylite Compressive Clayfill against deformation under the construction loads

Products assessed	Assessment method	Requirement	Result
Stylite Compressive Clayfill Low Density Expanded Polystyrene Boards	BBA Method	Resistance to construction load. The products must not deform by more than 4 mm under the load of 15 kN·m ⁻² .	Pass

1.1.4 On the basis of data assessed, the products have sufficient resistance and compressibility to resist the anticipated actions in the temporary and permanent condition.

2 Safety in case of fire

Not applicable.

3 Hygiene, health and the environment

Not applicable.

4 Safety and accessibility in use

Not applicable.

5 Protection against noise

Not applicable.

6 Energy economy and heat retention

Not applicable.

7 Sustainable use of natural resources

The products are made from EPS, which can be recycled.

8 Durability

8.1 The potential mechanisms for degradation and the known performance characteristics of the materials in the products were assessed.

8.2 The products are dimensionally stable under varying conditions of temperature and humidity. They are rot-proof and water resistant and will remain effective as a compressible fill for the expected life of the building in which they are installed.

PROCESS ASSESSMENT

Information provided by the Certificate holder was assessed for the following factors:

9 Design, installation, workmanship and maintenance

9.1 Design

9.1.1 A suitability competent and experienced individual must perform a site-specific assessment, and design the correct minimum thickness of the products from the expected expansion using the information in sections 9.1.1.1 to 9.1.1.4 and 9.1.2 and 9.1.3 of this Certificate.

For ground beams and pile caps

9.1.1.1 The maximum likely vertical ground movement due to clay heave (H mm) must be established from the site investigation.

9.1.1.2 The acceptable upward pressure on the concrete (P kN·m⁻²) must be established as used in the concrete design.

For trench-filled foundations

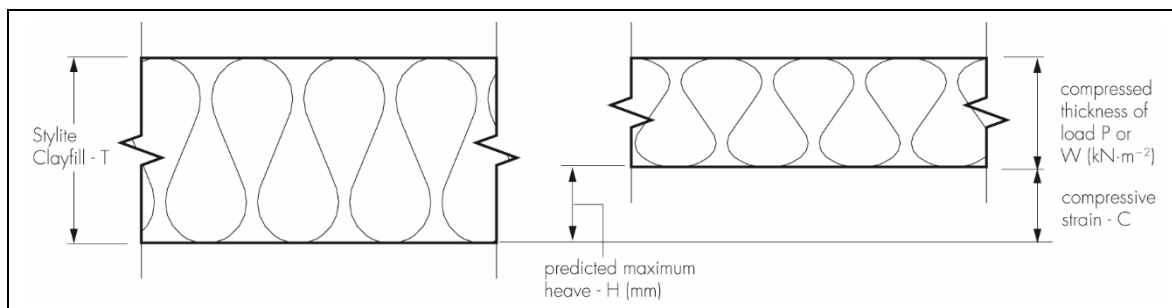
9.1.1.3 The expected lateral movement due to clay heave (H mm) must be established from the site investigation.

9.1.1.4 The maximum acceptable lateral pressure on the foundation as used in the concrete design (W kN·m⁻² — W) must not exceed 40 kN·m⁻².

9.1.2 The thickness of the products is then established (see Figure 1) by finding the value of the compressive strain (C %) from Figure 2 (using design value for P or W) and calculating the thickness of the products required (T mm) from the formula:

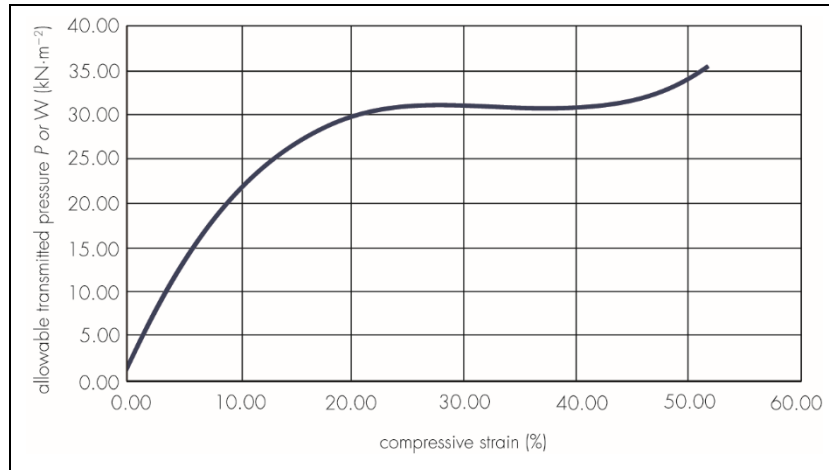
$$T = 100 \frac{H}{C} + 10$$

Figure 1 Determination of thickness required



9.1.3 The pressure transmitted versus strain of the products must be as shown in Figure 2, which is based on a strain rate of 2% per day.

Figure 2 Relationship of pressure to compressive strain



9.1.4 The products must not be used where the depth of in-situ concrete is greater than 600 mm in a single pour.

9.1.5 Stylite Compressive Clayfill Low Density Expanded Polystyrene Boards must not be used under ground-bearing slabs.

9.1.6 It is important that the whole of the underside of concrete members is protected with the products to prevent differential loading on the member.

9.1.7 For sites subject to *NHBC Standards 2024*, the void characteristics as shown in Table 4 of this Certificate are required.

Table 4 Void characteristics

Shrinkage potential	Void dimension against side of foundation and ground beam (mm)	Void dimension under ground beams, and suspended in-situ concrete ground floor (mm)
Low	0	50
Medium	25	100
High	35	150

9.2 Installation

9.2.1 Installation instructions provided by the Certificate holder were assessed and judged to be appropriate and adequate.

9.2.2 Installation instructions must be carried out in accordance with the recommendations of BS 8000-0 : 2014, BS EN 1997-1 : 2024, this Certificate, and the Certificate holder's instructions. A summary of instructions and guidance is provided in Annex A.

9.2.3 Adequate supervision must be maintained and, if required, the Certificate holder's specialists will attend the site to provide demonstrations and ensure correct installation.

9.2.4 Normal precautions for handling EPS materials must be taken to avoid damaging the products during off-loading, storage, handling and installation. Any damaged areas must be repaired or replaced before pouring the concrete.

9.3 Workmanship

Practicability of installation was assessed by the BBA, on the basis of the Certificate holder's information and a site visit to witness an installation in progress. To achieve the performance described in this Certificate, installation of the products must be carried out by a competent general builder, or a contractor, experienced with these types of products.

9.4 Maintenance and repair

Once installed, the products do not require maintenance.

10 **Manufacture**

10.1 The production processes for the products have been assessed, and provide assurance that the quality controls are satisfactory according to the following factors:

10.1.1 The manufacturer has provided documented information on the materials, processes, testing and control factors.

10.1.2 The quality control operated over batches of incoming materials has been assessed and deemed appropriate and adequate.

10.1.3 The quality control procedures and product testing to be undertaken have been assessed and deemed appropriate and adequate.

10.1.4 The process for management of non-conformities has been assessed and deemed appropriate and adequate.

10.1.5 An audit of each production location was undertaken, and it was confirmed that the production process was in accordance with the documented process, and that equipment has been properly tested and calibrated.

10.1.6 Quality control checks are carried out during manufacture, on:

- the density of the polystyrene beads
- the weight of the boards
- load/deformation characteristics.

†10.2 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.

11 **Delivery and site handling**

11.1 The Certificate holder stated that the products are delivered to site polythene wrapped.

11.2 Each pack carries a label bearing the Certificate holder's name, product description, essential instructions for installation and handling, and the BBA logo incorporating the number of this Certificate.

11.3 Delivery and site handling must be performed in accordance with the Certificate holder's instructions and this Certificate, including:

11.3.1 The products must be stored flat and protected from high winds and prolonged exposure to sunlight.

11.3.2 Care must be taken to avoid contact with solvents and liquid bitumen or mastic products. The products must not be exposed to open flame or other ignition sources. Careful consideration must also be given to the management of fire when in storage.

†ANNEX A – SUPPLEMENTARY INFORMATION

Supporting information in this Annex is relevant to the products but has not formed part of the material assessed for the Certificate.

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.

Management Systems Certification for production

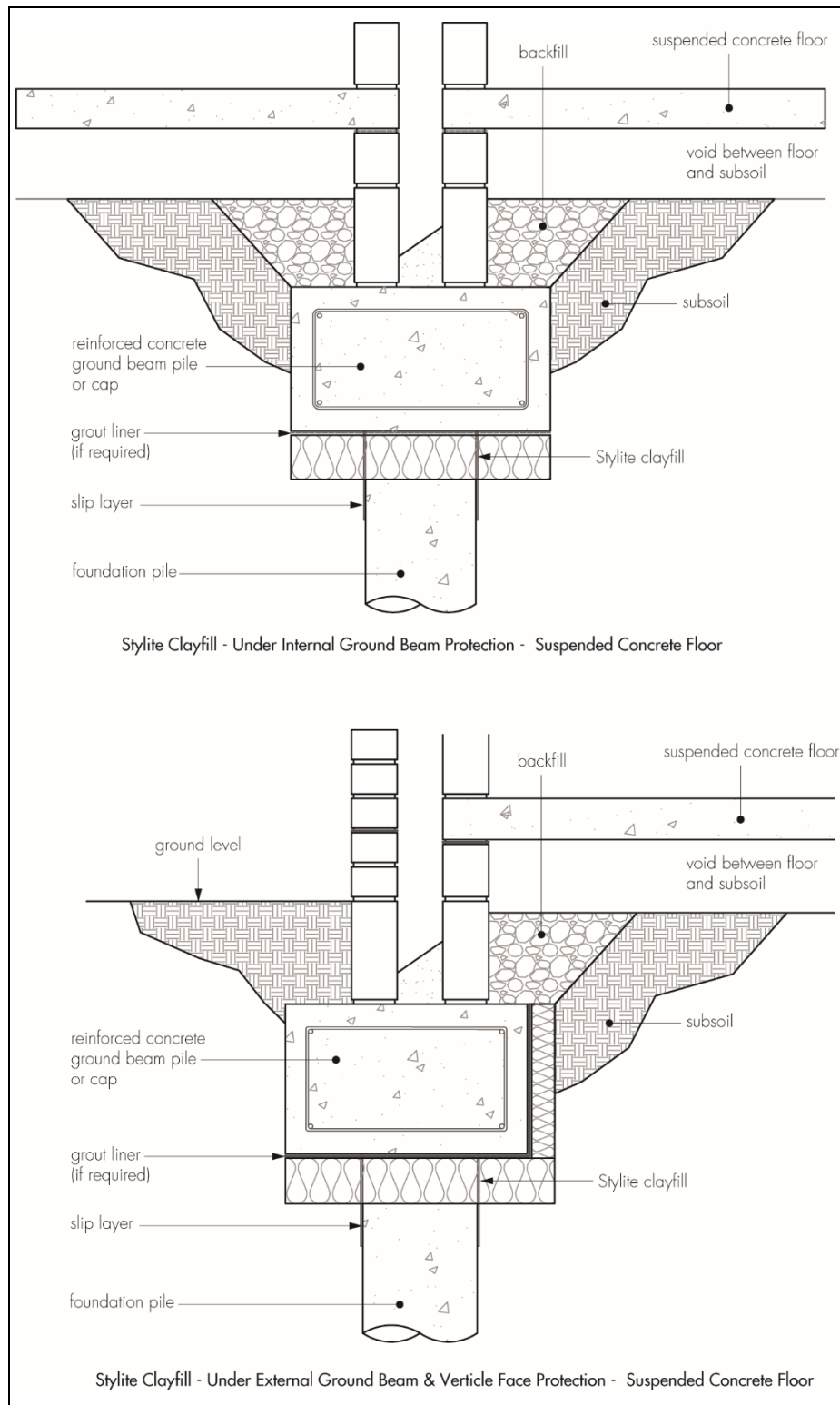
The management system of the manufacturer has been assessed and registered as meeting the requirements of ISO 9001 : 2015 by British Assessment Bureau (Certificate 197638).

Additional information on installation

Procedure

A.1 Underground beams and pile caps must be used in piled construction (see Figure 3).

Figure 3 Detail of pile and ground beam



A.2 The trenches are excavated as normal but taking account of the required thickness of the products.

A.3 The bottom of the excavation must be flat, even and properly compacted. In certain situations, this may require blinding the trench bottom with concrete or granular material.

A.4 The boards are laid closely butted on the prepared excavation, ensuring that the whole area of the ground beam is covered. Small gaps between boards must be backfilled with 'as dug' or granular material.

A.5 Where concrete piles protrude into the trench, the boards are cut to suit with a fine-toothed saw.

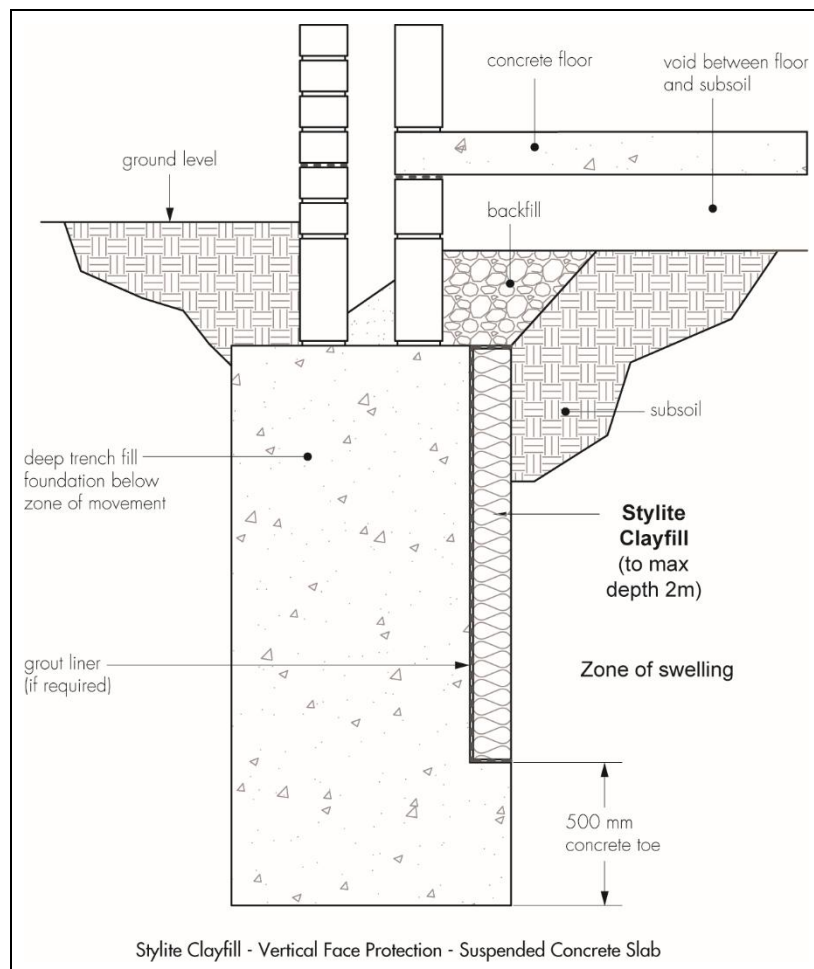
A.6 Sufficient concrete spacer blocks must be used to ensure that the correct depth of concrete cover to the reinforcement is achieved. The quantity and type of spacer blocks must be established so that the load transmitted to the products must not exceed $15 \text{ kN}\cdot\text{m}^{-2}$, to prevent penetration into the products. The dimensions of the spacer blocks must be 75 by 75 mm (as a minimum) and the spacer blocks must be at maximum 500 mm centres.

A.7 Where boards are required to protect the beam from lateral pressure, they can be positioned either abutting the lower board or supported upon it, depending on the overall width (see Figure 3). Where the boards are not adequately supported by the trench wall, suitable shuttering must be used to protect the boards during backfilling of the void, prior to the concrete pour.

Vertical faces of trench-fill foundations

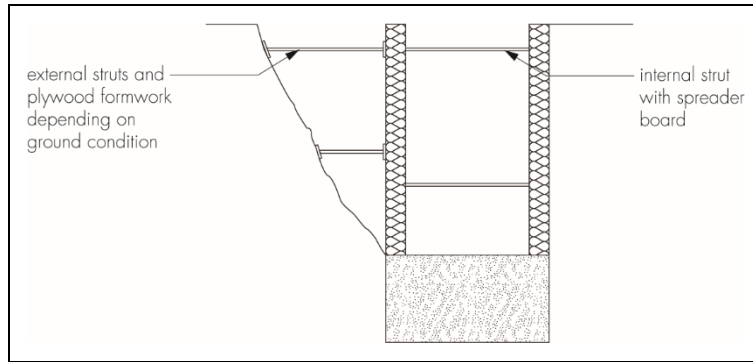
A.8 The excavation must be founded below the movement zone of the clay and the boards positioned in accordance with NHBC requirements, ie 500 mm above the bottom of the trench on the zone-of-swelling side of the excavation (see Figure 4).

Figure 4 Details of deep trench fill



A.9 To ensure that the products remain in the correct position and to prevent breakage, they must be adequately supported on both faces prior to concreting (see Figure 5).

Figure 5 Typical installation



A.10 Internal support must be provided in the form of struts with adequate spreader plates.

A.11 External support may be provided at the face of the excavation except in flinty or boulder clay, where sharp projections may cause damage and/or where the trench sides do not provide adequate support (see Figure 5).

A.12 The boards must be adequately restrained to prevent uplift during concrete placement.

A.13 Small infill panels must be securely fixed in position.

Bibliography

BS 8000-0 : 2014 + A1 : 2024 *Workmanship on construction sites — Introduction and general principles*

BS EN 1997-1 : 2024 *Eurocode 7 — Geotechnical design —Part 1 – General rules*

ISO 9001 : 2015 *Quality management systems — Requirements*

Conditions of Certificate

Conditions

1 This Certificate:

- relates only to the product 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
- 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
- and any matter arising out of or in connection with it or its subject matter (including non-contractual disputes or claims) is governed by and construed in accordance with the law of England and Wales.
- the courts of England and Wales shall have exclusive jurisdiction to settle any matter arising out of or in connection with this Certificate or its subject matter (including non-contractual disputes or claims).

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.

3 This Certificate will be displayed on the BBA website, and the Certificate Holder is entitled to use the Certificate and Certificate logo, provided that the product 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.

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

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

6 Any information relating to the manufacture, supply, installation, use, maintenance and removal of this product which is contained or referred to in this Certificate is the minimum required to be met when the product 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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