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**Agrément
Certificate
No 02/3975**
Second issue*

Designated by Government
to issue
European Technical
Approvals

STYLITE CLAYFILL

Remblayage comprimable
Füllungs Komprimierbar

Product




• THIS CERTIFICATE RELATES TO STYLITE CLAYFILL, LOW-DENSITY, EXPANDED POLYSTYRENE BOARDS.

• The product is for use below concrete ground beams of a maximum depth of 600 mm, 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.

• It is essential that the correct minimum thickness is calculated from the expected expansion, and that the product is installed in accordance with the Installation part of this Certificate.

Regulations

1 The Building Regulations 2000 (as amended) (England and Wales)

 The Secretary of State has agreed with the British Board of Agrément the aspects of performance to be used by the BBA in assessing the compliance of compressible fill with the Building Regulations. In the opinion of the BBA, Stylite Clayfill, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements.

Requirement: A2

Ground movement

Comment:

The fill prevents expansion of clay soils impairing the stability of the building. See sections 8.1 and 8.2 of this Certificate.


Requirement: Regulation 7

Materials and workmanship

Comment:

The fill is acceptable. See section 9 of this Certificate.

2 The Building Standards (Scotland) Regulations 1990 (as amended)

 In the opinion of the BBA, Stylite Clayfill, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Regulations and related Technical Standards as listed below.

Regulation: 10

Fitness of materials and workmanship

Standard: B2.1

Selection and use of materials, fittings, and components, and workmanship

Comment:

The product can contribute to a construction meeting this Standard. See the *Installation* part of this Certificate.

Standard: B2.2

Selection and use of materials, fittings, and components, and workmanship

Comment:

The product is an acceptable material. See section 9 of this Certificate.

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Regulation: 11
Standard: C2.1
Comment:

Structure
Stability
The fill contributes to meeting the relevant requirements of this Standard. See sections 8.1 and 8.2 of this Certificate.

3 The Building Regulations (Northern Ireland) 2000



In the opinion of the BBA, there are no requirements in these Regulations pertaining to the use of Stylite Clayfill.

4 Construction (Design and Management) Regulations 1994 (as amended) Construction (Design and Management) Regulations (Northern Ireland) 1995 (as amended)

Information in this Certificate may assist the client, planning supervisor, designer and contractors to address their obligations under these Regulations.

See sections: 6 Delivery and site handling (6.1) and 10 Procedure (10.6).

Technical Specification

5 Description

5.1 Stylite Clayfill consists of low-density, expanded polystyrene boards, coloured orange.

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

Table 1 Board sizes (mm)⁽¹⁾

Thickness	Length	Width
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) Special sizes available if required.

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

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

6 Delivery and site handling

6.1 The board packs are normally delivered to site shrink-wrapped. Each pack carries a label bearing the manufacturer's name, product description, essential instructions for installation and handling and the BBA identification mark incorporating the number of this Certificate.

6.2 The product must be stored flat and protected from high winds and prolonged exposure to sunlight.

Design Data

7 General

7.1 Stylite Clayfill, when designed and installed in accordance with the recommendations of this Certificate, is effective in reducing the pressure exerted on ground beams in piled foundation construction, and on the sides of trench-fill foundations up to 2 m deep.

7.2 It is important that the whole of the underside of concrete members be protected with Stylite to prevent differential loading on the member.

7.3 Each installation must be designed from the following information:

For ground beams and pile caps

- The maximum likely vertical ground movement due to clay heave (H mm) established from the site investigation.
- The acceptable upward pressure on the concrete (P kNm⁻²) as used in the concrete design.

For trench-fill foundations

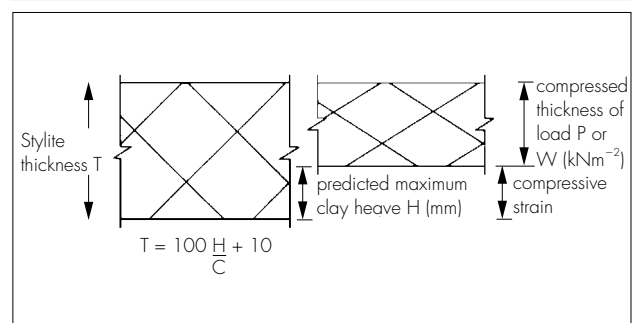
- The expected lateral movement due to clay heave (H mm) established from the site investigation.
- The maximum acceptable lateral pressure on the foundation as used in the concrete design (W kNm⁻² — W must not exceed 40 kNm⁻²).

7.4 The thickness is then established by (see Figure 1):

- finding the value of the compressive strain (C %) from Figure 2 (using design value for P or W — see section 3.3), and
- calculating the thickness required (T mm) from the formula:

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

Figure 1 Determination of thickness required



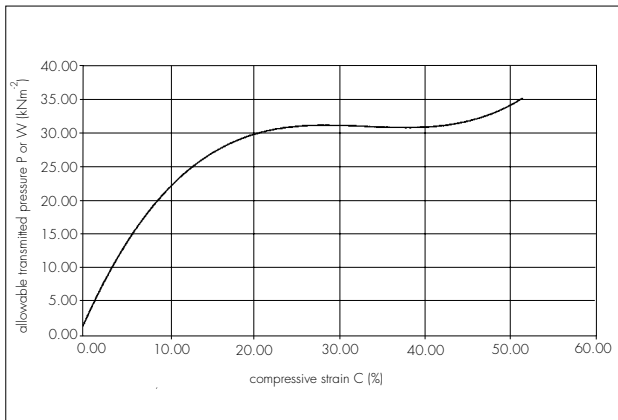
8 Resistance to pressure



8.1 The pressure transmitted/strain relationship of the product is given in Figure 2, which is based on a strain rate of 2% per day.

8.2 The product must not be used where the depth of in-situ concrete is greater than 600 mm.

Figure 2 Graph showing relationship of pressure to compressive strain



9 Durability



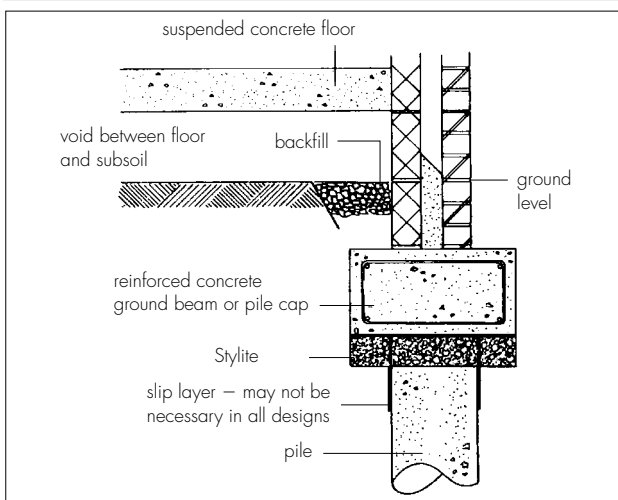
The product is dimensionally stable under varying conditions of temperature and humidity. It is rot-proof and water resistant and will remain effective as a compressible fill for the life of the building.

Installation

10 Procedure

Ground beams and pile caps in piled construction (see Figure 3)

Figure 3 Detail of pile and ground beam



10.1 The trenches are excavated as normal, but taking account of the required thickness.

10.2 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.

10.3 The product is 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.

10.4 Where concrete piles protrude into the trench, the boards should be cut to suit with a fine-toothed saw.

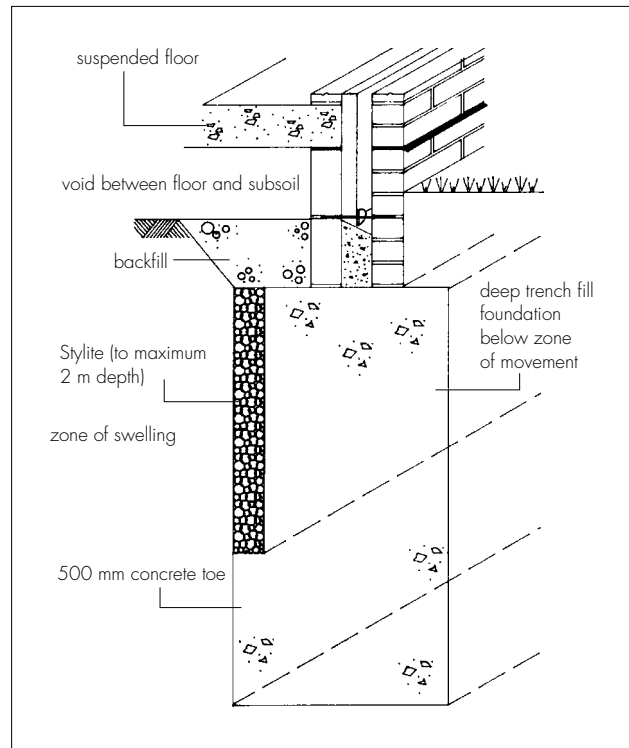
10.5 Sufficient concrete spacing blocks must be used to ensure that the correct depth of concrete cover to the reinforcement is achieved. The quantity and type of spacers must ensure that the load transmitted to the does not exceed 15 kNm^{-2} , to prevent penetration into the

Stylite boards (typically 75 mm by 75 mm blocks at 500 mm centres).

Vertical faces of trench-fill foundations

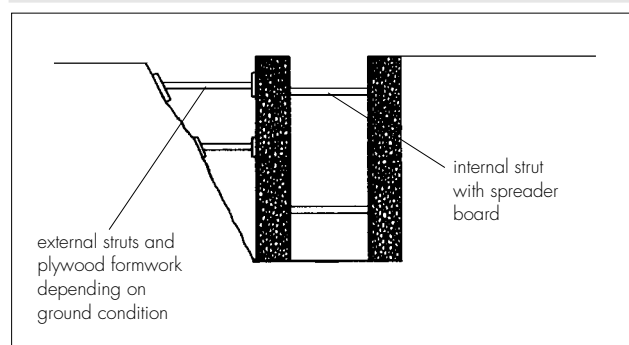
10.6 The excavation must be founded below the movement zone of the clay and the board positioned in accordance with NHBC requirements, ie 500 mm above the bottom of the trench on the zone-of-swelling side of the excavation (see Figure 4).

Figure 4 Details of deep trench fill



10.7 To ensure that the Stylite remains in the correct position and to prevent breakage, it should be adequately supported on both faces prior to concreting (see Figure 5).

Figure 5 Typical installation



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

10.9 External support may be provided by 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).

10.10 The product must be adequately restrained to prevent uplift during concrete placement.

10.11 Small infill panels must be securely fixed in position.

Technical Investigations

The following is a summary of the technical investigations carried out on Stylite Clayfill.

11 Tests

An examination was made of test data and tests were conducted to determine:

- density
- dimensional accuracy
- effect of density on pressure transmitted
- the pressure transmitted through the board when subjected to constant strain of 2% per day
- load capacity
- reduction in pressure transmitted when subjected to 50% compression
- compression under sustained loading.

12 Investigations

12.1 The manufacturing process was examined, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

12.2 Site visits were carried out to assess the practicability of installation.

12.3 An assessment was made of the performance characteristics and durability of the product.

Conditions of Certification

13 Conditions

13.1 This Certificate:

- relates only to the product that is described, installed, used and maintained as set out in this Certificate;
- is granted only to the company, firm or person identified on the front cover — no other company, firm or person may hold or claim any entitlement to this Certificate;
- 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.

13.2 References in this Certificate to any Act of Parliament, Regulation made thereunder, Directive or Regulation of the European Union, Statutory Instrument, Code of Practice, British Standard, manufacturers' instructions or similar publication, are references to such publication in the form in which it was current at the date of this Certificate.

13.3 This Certificate will remain valid for an unlimited period provided that the product and the manufacture and/or fabrication including all related and relevant 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; and
- are reviewed by the BBA as and when it considers appropriate.

13.4 In granting this Certificate, the BBA is not responsible for:

- the presence or absence of any patent or similar rights subsisting in the product or any other product;
- the right of the Certificate holder to market, supply, install or maintain the product; and
- the nature or standard of individual installations of the product or any maintenance thereto, including methods and workmanship.

13.5 Any recommendations relating to the use or installation of this product which are contained or referred to in this Certificate are the minimum standards required to be met when the product is used. They do not purport in any way to restate the requirements of the Health & Safety at Work etc Act 1974, or of any other statutory, common law or other duty which may exist at the date of this Certificate or in the future; nor is conformity with such recommendations to be taken as satisfying the requirements of the 1974 Act or of any present or future statutory, common law or other duty of care. In granting this Certificate, the BBA does not accept responsibility to any person or body for any loss or damage, including personal injury, arising as a direct or indirect result of the installation and use of this product.



In the opinion of the British Board of Agrément, Stylite Clayfill is fit for its intended use provided it is installed, used and maintained as set out in this Certificate. Certificate No 02/3975 is accordingly awarded to Styrene Packaging and Insulation Ltd.

On behalf of the British Board of Agrément

Date of Second issue: 27th May 2004

Chief Executive

**Original Certificate issued on 23rd December 2002. This amended version issued to include a change to the Certificate holder's address and reference to a revision in the Scottish Building Standards.*