

Jablite Limited

Unit A, Rudford Industrial Estate
Ford Road
Ford
Nr Arundel
West Sussex
BN18 0BD

Tel: 01903 725282

e-mail: sales@jablite.co.uk

website: www.jablite.co.uk



Agrément Certificate

20/5831

Product Sheet 1

CLAYMASTER COMPRESSIBLE FILL

CLAYMASTER COMPRESSIBLE FILL LOW DENSITY EXPANDED POLYSTYRENE BOARDS

This Agrément Certificate Product Sheet⁽¹⁾ relates to Claymaster Compressible Fill Low Density Expanded Polystyrene Boards, 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 pressure exerted on the concrete by expansion of the clay soils (clay heave) during the life of the structure.

(1) Hereinafter referred to as 'Certificate'.

CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information 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

Resistance to pressure — the products have sufficient resistance to upward and lateral pressure to sustain the design load (see section 6).

Durability — the products will have adequate durability as compressible fill for the expected life of the building (see section 8).



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

A handwritten signature in black ink, appearing to read 'Giesler'.

Hardy Giesler
Chief Executive Officer

Date of First issue: 25 November 2020

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.bbacservs.co.uk. Readers MUST check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA directly.

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

British Board of Agrément

Bucknalls Lane
Watford
Herts WD25 9BA

tel: 01923 665300

clientservices@bbacservs.co.uk

www.bbacservs.co.uk

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Regulations

In the opinion of the BBA, Claymaster Compressible Fill 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 presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):



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

Requirement: A2

Comment:

Ground movement

The products prevent expansion of clay soils impairing the stability of the structure. See section 6 of this Certificate.

Regulation: 7(1)

Comment:

Materials and workmanship

The products are acceptable. See section 8 and the *Installation* part of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation: 8(1)

Comment:

Durability, workmanship and fitness of materials

The use of the products can contribute to a construction satisfying the requirements of this Regulation. See section 8 and the *Installation* part of this Certificate.

Regulation: 9

Standard: 1.1(b)

Comment:

Building standards applicable to construction

Structure

The products contribute to satisfying the relevant requirements of this Standard. See section 6 of this Certificate.

Standard: 7.1(a)(b)

Comment:

Statement of sustainability

The products can contribute to satisfying the relevant requirements of Regulation 9, Standards 1 to 6, and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard.

Regulation: 12

Comment:

Building standards applicable to conversions

Comments in relation to 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(a)(i)(iii)(b)(i)

Comment:

Fitness of materials and workmanship

The products are acceptable. See section 8 and the *Installation* part of this Certificate.

Regulation: 30

Comment:

Stability

The products contribute to satisfying the relevant requirements of this Regulation. See section 6 of this 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.

See section: **3 Delivery and site handling (3.3) of this Certificate.**

Additional Information

NHBC Standards 2020

In the opinion of the BBA, Claymaster Compressible Fill 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*.

CE marking

The Certificate holder has taken the responsibility of classifying and labelling the products in accordance with harmonised European Standard BS EN 14933 : 2007.

Technical Specification

1 Description

1.1 Claymaster Compressible Fill Low Density Expanded Polystyrene Boards are low-density expanded polystyrene (EPS) boards, coloured pink.

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

Table 1 Board sizes (in mm)

Thickness	Length ⁽¹⁾	Width ⁽¹⁾
50	2400	600 or 1200
75	2400	600 or 1200
100	2400	600 or 1200
150	2400	600 or 1200
200	2400	600 or 1200

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

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

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

2 Manufacture

2.1 The products are cut from EPS blocks with a detectable pink colouration.

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 check that the specifications and quality control operated by the manufacturer are being maintained.

2.3 The management system or the manufacturer has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2015 by CQS Ltd (Certificate GB2005746).

3 Delivery and site handling

3.1 The products are normally delivered to site polythene wrapped. Each pack carries a label bearing the Certificate holder's name, product description, essential instructions for storage and the BBA logo incorporating the number of this Certificate.

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

3.3 Care must be taken to avoid contact with solvents and liquid bitumen or mastic products. The boards must not be exposed to open flame or other ignition sources.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Claymaster Compressible Fill Low Density Expanded Polystyrene Boards.

Design Considerations

4 Use

4.1 Claymaster Compressible Fill Low Density Expanded Polystyrene Boards, when designed and installed in accordance with the recommendations of this Certificate, are satisfactory for use to reduce the pressure exerted on ground beams in piled foundation construction, and on the sides of trench-filled foundations up to two metres deep, caused by the expansion of clay soil (clay heave) during the life of the structure.

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

4.3 It is essential that the correct minimum thickness is calculated from the expected expansion in accordance with sections 4.4 and 4.5.

4.4 Each installation must be designed from the following:

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 $\text{kN}\cdot\text{m}^{-2}$) as used in the concrete design

For trench-filled foundation

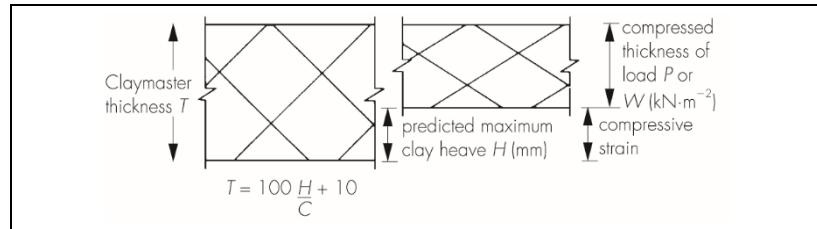
- the expected lateral movement due to clay heave (H mm) established from the site investigation
- the maximum acceptable lateral pressure on the foundation as used in the concrete design (W $\text{kN}\cdot\text{m}^{-2}$ — W must not exceed 40 $\text{kN}\cdot\text{m}^{-2}$).

4.5 The thickness of the products is then established (see Figure 1) by:

- finding the value of the compressive strain (C %) from Graph 1 (using design value for P or W — see section 4.4), and
- calculating the thickness of the product required (T mm) from the formula:

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

Figure 1 Determination of thickness required



5 Practicability of installation

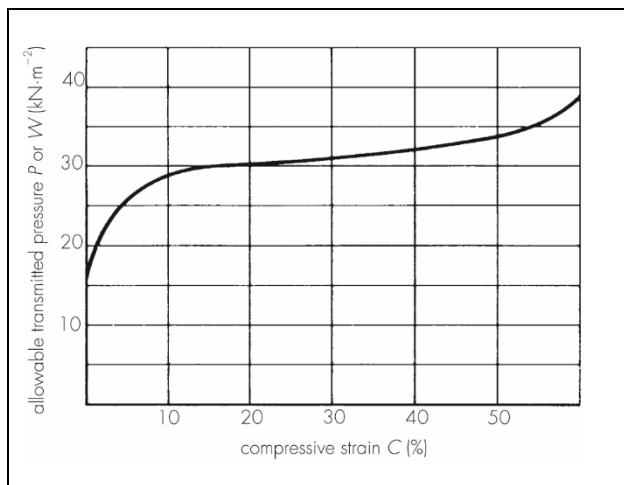
The products are designed to be installed by a contractor experienced with these types of products. It is usual practice to have the Certificate holder's specialists on site to ensure correct installation (see section 10).

6 Resistance to pressure



6.1 The pressure transmitted versus strain of the products is shown in Graph 1, which is based on a strain rate of 2% per day.

Graph 1 Relationship of pressure to compressive strain



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

7 Maintenance

Once installed, the products do not require maintenance.

8 Durability



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.

9 Reuse and recyclability

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

Installation

10 General

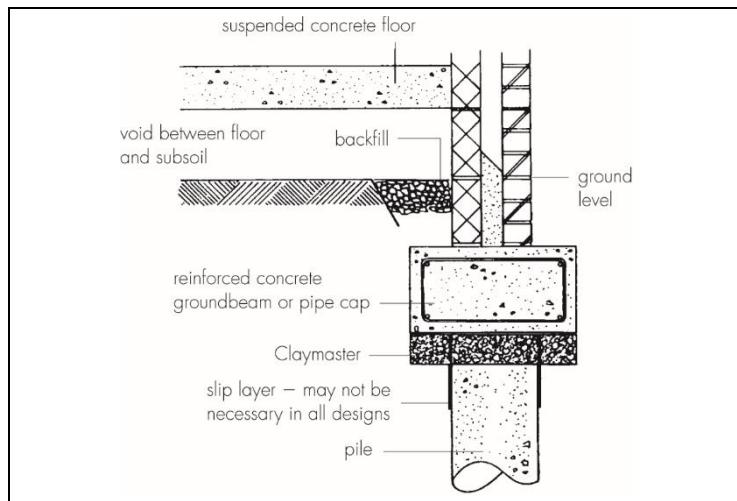
10.1 Adequate supervision must be maintained and, if required, the Certificate holder's specialists will attend the site to provide demonstrations and ensure correct installation.

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

11 Procedure

11.1 Underground beams and pile caps should be used in piled construction (see Figure 2)

Figure 2 Detail of pile and ground beam



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

11.3 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.

11.4 The products 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.

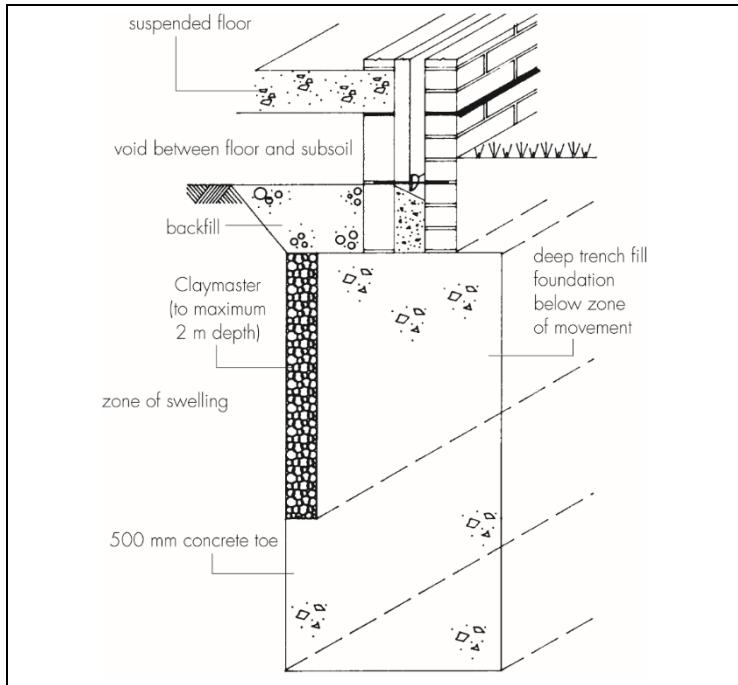
11.5 Where concrete piles protrude into the trench, the products are cut to suit with a fine-toothed saw.

11.6 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 ensure that the load transmitted to the products does not exceed $15 \text{ kN}\cdot\text{m}^{-2}$, to prevent penetration into the products (typically 75 by 75 mm spacer blocks at 500 mm centres).

Vertical faces of trench-fill foundations

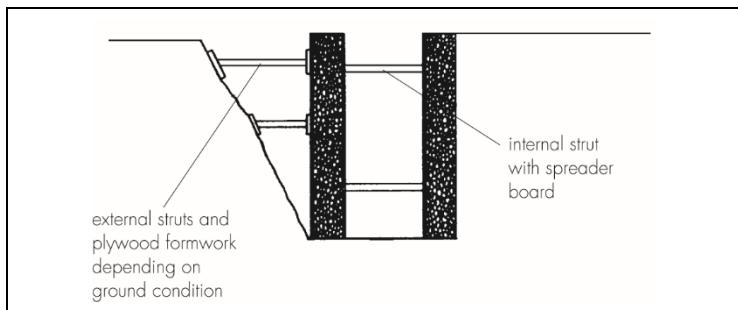
11.7 The excavation must be founded below the movement zone of the clay and the boards positioned in accordance with NHBC requirements, ie 500 mm above the bottom of the trench on the zone-of-swelling side of the excavation (see Figure 3).

Figure 3 Details of deep trench fill



11.8 To ensure that the products remain in the correct position and to prevent breakage, they should be adequately supported on both faces prior to concreting (see Figure 4).

Figure 4 Typical installation



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

11.10 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 4).

11.11 The products must be adequately restrained to prevent uplift during concrete placement.

11.12 Small infill panels (offcuts) must be securely fixed in position.

Technical Investigations

12 Tests

Tests were conducted and the results assessed 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.

13 Investigations

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

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

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

Bibliography

BS EN 14933 : 2007 *Thermal insulation and light weight fill products for civil engineering applications — Factory made products of expanded polystyrene (EPS) — Specification*

BS EN ISO 9001 : 2015 *Quality management systems — Requirements*

Conditions of Certification

14 Conditions

14.1 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.

14.2 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.

14.3 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.

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

14.5 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.

14.6 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.