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Agrément Certificate
12/4963
Product Sheet 1

WHITEROCK CLAY HEAVE VOID FORMERS

HEAVE STOPPER

This Agrément Certificate Product Sheet⁽¹⁾ relates to Heave Stopper, a range of void former panels comprising laminated cardboard facings with a cardboard honeycomb core which are used to limit the pressure exerted on in-situ, reinforced suspended concrete ground floors or piled ground beams caused by expansion of clay soils (clay heave) or ground recovery.

(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

Structural design — the product has an adequate strength to resist short-term construction phase load bearing capability, required of in-situ concrete floors and beams in piled foundations (see section 6).

Durability — the product is designed to have limited durability and will collapse after saturation to perform effectively as a void former for the life of the building (see section 8).

The BBA has awarded this Certificate to the company named above for the product described herein. This product has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of First issue: 1 February 2013



Brian Chamberlain
Head of Approvals — Engineering



Greg Cooper
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.

Regulations

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



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



The Building (Scotland) Regulations 2004 (as amended)



The Building Regulations (Northern Ireland) 2012

Construction (Design and Management) Regulations 2007

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

In the opinion of the BBA, there is no information in this Certificate which relates to the obligations of the client, CDM co-ordinator, designer and contractors under these Regulations.

See sections: 3 *Delivery and site handling* (3.3 and 3.4) of this Certificate.

Additional Information

NHBC Standards 2013

NHBC accepts the use of Heave Stopper, when installed and used in accordance with this Certificate, in relation to *NHBC Standards*, Chapter 4.2 (D5-D7) *Foundations (shrinkable soils)*, Chapter 4.2 (D8) *Designing to accommodate Heave*, Chapter 4.4 *Strip and trench fill foundations*, and Chapter 4.5 *Raft, pile, pier and beam foundations*.

Technical Specification

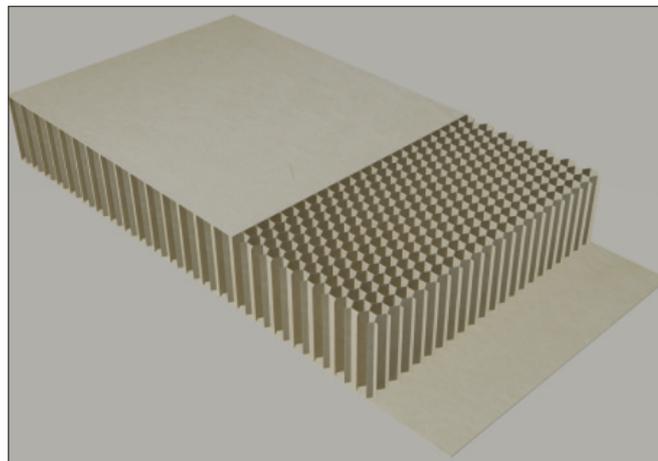
1 Description

1.1 Heave Stopper comprises a cardboard honeycomb core, sandwiched with laminated cardboard facings and is supplied in four different thicknesses (see Table 1). The panels are 2400 mm long by 1200 mm wide (see Figure 1).

Table 1: Heave Stopper dimensions

Panel reference	Thickness (mm)	Void required (mm)
160 mm Heave Stopper	160	150
110 mm Heave Stopper	110	100
85 mm Heave Stopper	85	75
60 mm Heave Stopper	60	50

Figure 1 Heave Stopper panel



1.2 Proprietary polythene sheet (500 gauge) is used in conjunction with the Heave Stopper panels to keep the product dry during installation and construction phase.

1.3 A plastic flanged void pipe with a 28 mm inside diameter is an ancillary item used with the panels. The pipe is raked one end and supplied with a flange fixing plate for insertion into the top face to introduce water into the cardboard honeycomb core, once the concrete has set sufficiently (see section 11.7).

2 Manufacture

2.1 The product is manufactured from recycled cardboard into a honeycomb structure with laminated cardboard facings to create a sandwich panel.

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.

3 Delivery and site handling

3.1 Heave Stopper panels are delivered to site on pallets with a polythene cover. Each pallet bears a label with the Certificate holder's name, product name and thickness, manufacturing reference batch code and BBA logo.

3.2 During offloading, care must be taken to avoid piercing or tearing the polythene, or damaging the panels.

3.3 The panels must be kept dry, stored flat and off ground, preferably on the delivery pallets to prevent any moisture ingress whilst in storage. Stacked pallets must not exceed two high. The protective cover must not be removed until ready to use.

3.4 The panels must not be exposed to flame or ignition. Careful consideration should be given to the management of fire risk when in storage.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Heave Stopper.

Design Considerations

4 General

4.1 Heave Stopper panels are effective in limiting the pressure exerted on in-situ suspended concrete ground floors or piled ground beams caused by expansion of clay soils (clay heave) or ground recovery.

4.2 The thickness of Heave Stopper to be used depends on the required void, but should not be less than the void needed plus 10 mm (see Table 1). The maximum likely ground movement due to clay heave, and hence the required void is established from site investigations. Further guidance on predicted ground movements in shrinkable soils is given in the *NHBC Standards 2013*, Chapter 4.2 (D6 and D8).

4.3 Where underground pipe runs or conduits are routed beneath the floor slab, a sufficient void must be provided above the crown or top to avoid distortion or crushing during heave.

4.4 Use of the product in the following situations is outside the scope of this Certificate:

- below the water table
- at depths greater than 2 m below proposed ground level
- on sites where hazardous gasses (eg methane or radon) may be encountered.

5 Practicability of installation

The panels are designed to be installed by a competent general builder, or a contractor experienced with this type of product.

6 Structural design

6.1 When dry, the product can withstand a uniform pressure of 30 kN·m⁻² and is designed to have sufficient compressive strength to support the weight of foot traffic, steel reinforcement and wet concrete during the construction phase.

6.2 When water is introduced after the concrete has set (see sections 11.8 and 11.9), the honeycomb structure loses its compressive strength and will collapse under a nominal compressive 'failure load' not exceeding 3 kN·m⁻², and therefore, yielding to ground heave without transmitting pressure to the structure.

7 Maintenance

No maintenance is required.

8 Durability

8.1 The Heave Stopper panels are robust and will offer the short-term load life required during the construction phase.

8.2 Provided the correct panel thickness is selected; the void once formed (see section 11.7 and 11.8) will normally be sufficient to protect against clay heave or ground recovery for the life of the building.

9 Re use and recyclability

Heave Stopper panels are manufactured from recycled material procured from FSC-approved sources. The product is fully recyclable in normal waste streams.

Installation

10 General

10.1 All floor constructions must be carried out in accordance with good building practice.

10.2 It is essential that Heave Stopper panels are kept dry during the installation. Measures must be taken to ensure that panels are not damaged through moisture ingress during the construction phase. Any damaged panels must not be used.

10.3 Provision should be made for the removal of all surface water from the foundation zone prior to placement of the panels. This may necessitate forming a sump nearby, with facilities for pumping to a suitable drain. The product must not be placed in waterlogged ground.

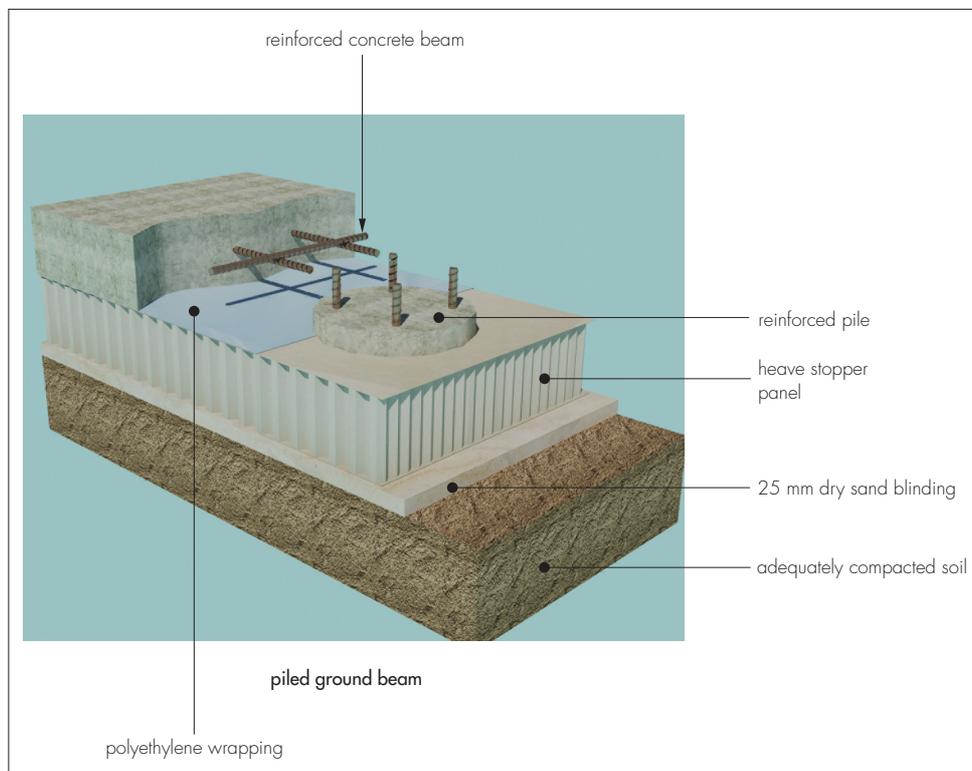
10.4 The Heave Stopper panels must be kept dry until the concrete achieves self-supporting strength. The time between laying the product and pouring the concrete should be kept to a minimum to reduce the risk of the panels getting wet.

10.5 The panels are easily handled and can be cut with a fine tooth saw to fit around piles or service ducts.

11 Procedure

11.1 Typical applications of Heave Stopper on piled in-situ suspended concrete ground floors and piled ground beams are shown in Figure 2.

Figure 2 Typical applications



11.2 The excavation must be level, even and blinded with a 25 mm dry sand/fine gravel layer to prevent pressure points damaging the polythene wrapping. Provision can be made for the positioning of pipework or ducting at this stage ensuring that the pipe crown or duct top is positioned at or below the underside of the panels.

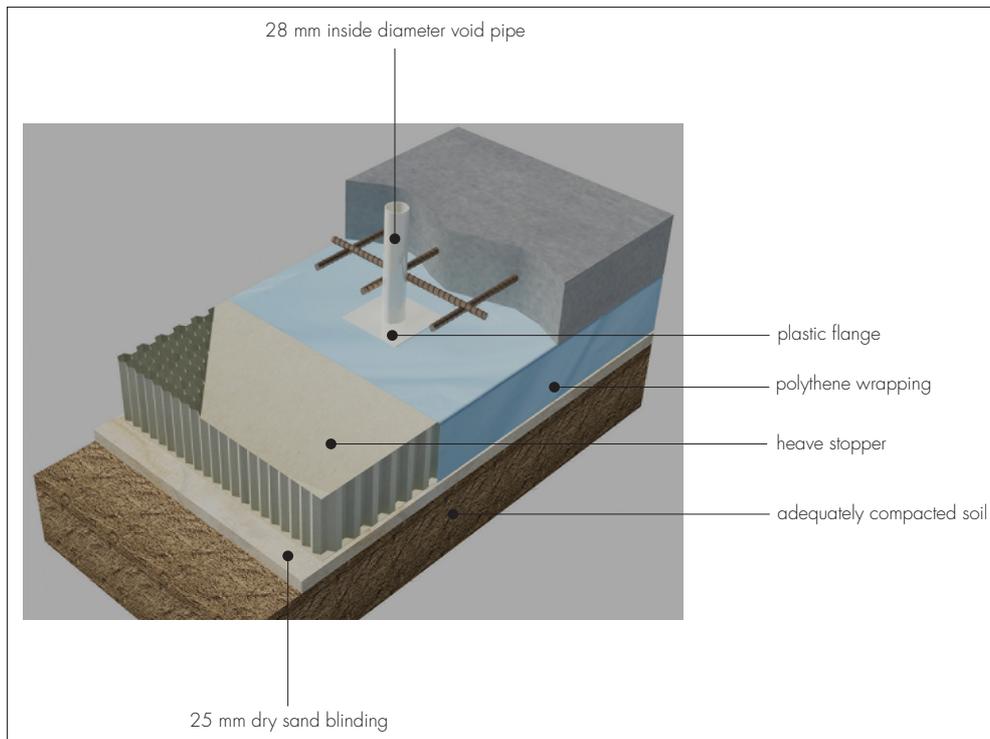
11.3 The placed panels must be wrapped in 125 μm (500 gauge) polythene sheeting and sealed with waterproof tape to keep the panels dry during the installation and construction, and to prevent water escaping during the saturation process.

11.4 The product can be used any side up. Adjoining panels must be butt closely together with joints kept to a minimum. Where necessary, panels should be trimmed to form a close fit around pile heads.

11.5 Suitable spacing blocks with a wide base must be used as per the design requirement to ensure that the correct depth of concrete cover is achieved. It must be ensured that the load transmitted to the panel does not exceed $30 \text{ kN}\cdot\text{m}^{-2}$.

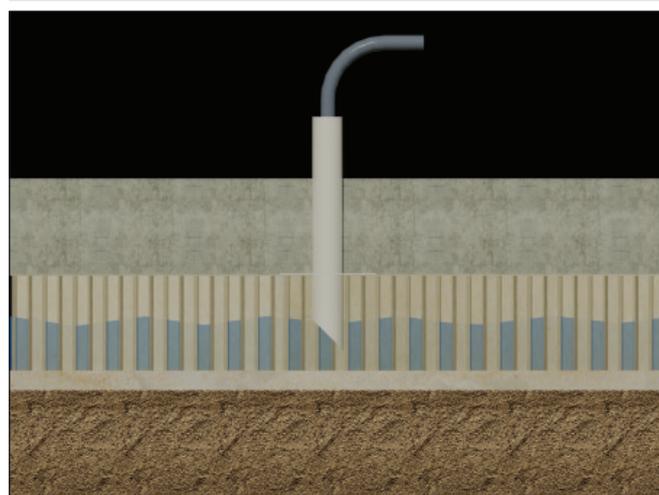
11.6 To make provision to introduce water into the Heave Stopper panels, prior to concrete pour, 28 mm diameter plastic flanged void pipes (see Figure 3) are inserted and tied to adjacent reinforcement to ensure they remain upright during concrete pour. The pipes are positioned through the top board of panel and penetrate into the honeycomb core. A minimum of one tube must be provided for each isolated area of Heave Stopper panel, otherwise one pipe per 25 m^2 will suffice.

Figure 3 Void pipe insertion



11.7 Once the concrete is poured and is totally self-supporting, water is introduced to the Heave Stopper panels to collapse the cell structure (see Figure 4). A hose pipe is inserted into the void pipe and water should be introduced in a slow, steady, continuous flow for at least 2 hours.

Figure 4 Void pipe — section view



11.8 To ensure total saturation of the Heave Stopper panels, further water should be introduced at least twice over the next 48 hours. The hose pipe is then removed from the void pipe and the bottom facing of the panel and underlying polythene struck through with a metal rod to allow the water to drain away. When operations are completed, the pipe must be cut flush and sealed with suitable mortar or waterproof sealant.

12 Tests

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

- panel weight and dimensional accuracy
- load carrying capacity (dry)
- panel performance under concentrated loads
- panel performance during wetting
- panel performance after wetting.

13 Investigations

13.1 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.

13.2 A site visit was carried out to assess the practicability of installation.

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

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
- individual 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.