

Hanson Building Products

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Agrément Certificate
91/2723
Product Sheet 1

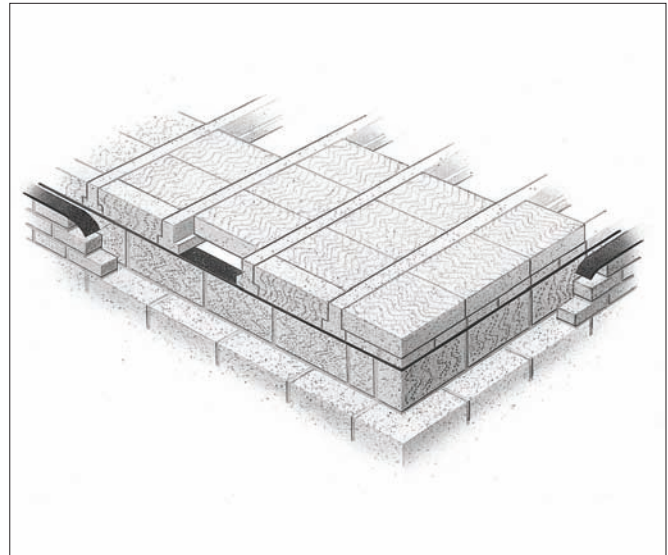
THERMALITE FLOORBLOCKS

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to Thermalite Floorblocks, aircrete blocks of gross dry density of 660 kgm^{-3} and an average compressive strength of 4 Nmm^{-2} for use in beam and block floors in single-occupancy dwellings, domestic garages and over basements.

AGRÉMENT 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

Thermal insulation — the thermal conductivity (λ value) of the product should be taken as $0.16 \text{ Wm}^{-1}\text{K}^{-1}$ for 'protected blockwork' (see section 5).

Condensation risk — condensation is unlikely to occur for a sand/cement finish over the product (see section 6).

Concentrated loads — an ultimate point load failure of 19.5 kN for a sand grouted floor was achieved in tests (see section 7).

Properties in relation to fire — the product is 'non-combustible' as defined in the national Building Regulations (and has a Class A1 reaction to fire classification) (see section 8).

Durability — aircrete is a durable material (see section 12).

The BBA has awarded this Agrément 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



Simon Wroe
Head of Approvals — Materials



Greg Cooper
Chief Executive

Date of First issue: 21 October 2008

Originally certificated on 20 November 1991

The BBA is a UKAS accredited certification body — Number 1113. 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, Thermalite Floorblocks, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements of the following Building Regulations:



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

| | | |
|--------------|--------------|--|
| Requirement: | A1 | Loading |
| Comment: | | Floors built with the product can meet this Requirement provided the design and construction complies with the conditions set out in sections 7.1 and 7.2 of this Certificate. |
| Requirement: | C2(c) | Resistance to moisture |
| Comment: | | Floors built with the product can meet this Requirement provided design and construction are in accordance with section 6.1 of this Certificate. |
| Requirement: | E2(b) | Protection against sound within a dwelling-house etc |
| Comment: | | Floors incorporating the product must include suitable finishes to meet this requirement. See section 9 of this Certificate. |
| Requirement: | L1(a)(i) | Conservation of fuel and power |
| Comment: | | Floors built with the product can contribute to satisfying this Requirement. See section 5 of this Certificate. |
| Requirement: | Regulation 7 | Materials and workmanship |
| Comment: | | The product is acceptable. See section 12 and the <i>Installation</i> part of this Certificate. |

In addition to the contribution which the product can make to meeting the relevant Requirements, the following comment should be noted:

| | | |
|--------------|-------|--|
| Requirement: | B3(1) | Internal fire spread (structure) |
| Comment: | | The product is 'non-combustible' and is unrestricted under this Requirement. See sections 8.1 and 8.2 of this Certificate. |



The Building (Scotland) Regulations 2004 (as amended)

| | | |
|-------------|-----------|---|
| Regulation: | 8(1)(2) | Fitness and durability of materials and workmanship |
| Comment: | | The use of the product satisfies the requirements of this Regulation. See sections 11, 12 and the <i>Installation</i> part of this Certificate. |
| Regulation: | 9 | Building standards – construction |
| Standard: | 1.1(a)(b) | Structure |
| Comment: | | Floors constructed with the product in accordance with sections 7.1 and 7.2 of this Certificate can contribute towards satisfying this Standard, with reference to clauses 1.1.1 ⁽¹⁾⁽²⁾ to 1.1.3 ⁽¹⁾⁽²⁾ . |
| Standard: | 3.15 | Condensation |
| Comment: | | Floors designed and constructed from the product in accordance with the section 6.1 of this Certificate can meet this Standard, with references to clauses 3.10.1 ⁽¹⁾⁽²⁾ , 3.15.1 ⁽¹⁾ , 3.15.4 and 3.15.5 ⁽¹⁾ . |
| Standard: | 6.1(b) | Carbon dioxide emissions |
| Standard: | 6.2 | Building insulation envelope |
| Comment: | | Floors constructed from the product can contribute to satisfying these Standards, with reference to clauses 6.2.1 ⁽¹⁾ to 6.2.3 ⁽¹⁾ . See section 5 of this Certificate. |
| Regulation: | 12 | Building standards – conversions |
| Comment: | | All comments given for this system under Regulation 9 also apply to this Regulation, with reference to clause 0.12.1 ⁽¹⁾ and Schedule 6 ⁽¹⁾ . (1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic). |

In addition to the contribution which the product can make to meeting the relevant Standards, the following comment should be noted:

| | | |
|-----------|-----|--|
| Standard: | 2.3 | Structural protection |
| Comment: | | The product is 'non-combustible' and floors designed and constructed from the product in accordance with sections 8.1 and 8.2 of this Certificate can meet this Standard, with reference to clauses 2.3.1 ⁽¹⁾ to 2.3.3 ⁽¹⁾ . |



The Building Regulations (Northern Ireland) 2000 (as amended)

| | | |
|-------------|----------|--|
| Regulation: | B2 | Fitness of materials and workmanship |
| Comment: | | The product is acceptable. See section 12 and the <i>Installation</i> part of this Certificate. |
| Regulation: | B3(2) | Suitability of certain materials |
| Comment: | | The product does not normally require maintenance. See section 11 of this Certificate. |
| Regulation: | C5 | Condensation |
| Comment: | | The product can be used in a floor that satisfies this Regulation. See section 6.1 of this Certificate. |
| Regulation: | D1 | Stability |
| Comment: | | Floors constructed in accordance with the <i>Installation</i> part of this Certificate have sufficient strength and stiffness to transfer the floor loads to the supporting walls. See sections 7.1 and 7.2 of this Certificate. |
| Regulation: | F2(a)(i) | Conservation measures |
| Regulation: | F3 | Target carbon dioxide Emissions Rate |
| Comment: | | Floors built with the product can contribute towards meeting the U value requirement. See section 5 of this Certificate. |

In addition to the contribution which the product can make to meeting the relevant Regulations, the following comment should be noted:

| | | |
|-------------|-------|---|
| Regulation: | E4(1) | Internal fire spread – Structure |
| Comment: | | The product is 'non-combustible' and is unrestricted under this Regulation. See sections 8.1 and 8.2 of this Certificate. |

Construction (Design and Management) Regulations 2007

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

Information in this Certificate may assist the client, CDM co-ordinator, designer and contractors to address their obligations under these Regulations.

See sections: 1 *Description (1.2)* and 2 *Delivery and site handling*.

Non-regulatory Information

NHBC Standards 2008

NHBC accepts the use of Thermalite Floorblocks, when installed and used in accordance with this Certificate, are capable of satisfying the requirements of *NHBC Standards Chapter 5.2 Suspended ground floors*.

Zurich Building Guarantee Technical Manual 2007

In the opinion of the BBA the use of Thermalite Floorblocks when installed and used in accordance with this Certificate are capable of satisfying the requirements of the *Zurich Building Guarantee Technical Manual, Section 3 Substructure, Sub-section Floors*.

General

This Certificate relates to Thermalite Floorblocks, for use as an infill to precast concrete beam and block floors, in single-occupancy dwellings and domestic garage floors.

Technical Specification

1 Description

1.1 Thermalite Floorblocks comprise cement, lime, pulverized-fuel ash (pfa) and coarse sand. Aluminium powder is the aerating agent. The blocks are wire-cut to the required dimensions and are cured in high-pressure steam autoclaves.

1.2 The blocks have the characteristics and sizes given in Table 1 and are available as:

- Floorblock — infill block for use between beams
- Endblock — for infill closing of beams at ends
- Coursing Slip — bedded on the wall and for closing edges of the floor.

Table 1 Block characteristics

| Characteristic (units) | Block type | | |
|--|---------------------------------|-------------------------|------------------------------|
| | Floorblock ⁽¹⁾ | Endblock ⁽¹⁾ | Coursing Slip ⁽¹⁾ |
| Face dimension (mm) | 440 x 350, 440 x 215, 440 x 540 | 440 x 140 | 215 x 100 |
| Width (mm) | 100 | 150, 175 | 40, 65 |
| Gross dry density (kgm ⁻³) | 660 | 660 | 660 |
| Average compressive strength (Nmm ⁻²) ⁽²⁾ | 4.0 | 4.0 | 4.0 |
| Minimum individual block compressive strength (Nmm ⁻²) | 3.2 | 3.2 | 3.2 |

(1) Floorblock weights range from 10.5 kg to 16.2 kg at 3% moisture content by weight.

(2) Conditioned to 6% moisture and surface ground.

1.3 Quality control of the process is operated automatically and continuously.

1.4 The blocks comply with the requirements of BS EN 771-4 : 2003 and are specified in accordance with the BS EN 771-4 : 2003 and BS 6073-2 : 1981.

2 Delivery and site handling

2.1 The blocks are supplied shrink-wrapped in packs or banded to pallets by special request. Shrink-wrapped packs may be off-loaded using mechanical grabs and fork-lift trucks may be used to off-load palletted blocks.

2.2 The blocks must be stored clear of the ground on a firm, level surface and protected from saturation. If supplied shrink-wrapped, this should be kept in place until the blocks are required for use.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Thermalite Floorblocks.

Design Considerations

3 Use

Thermalite Floorblocks are suitable for use in the construction of beam and block floors with a suitable screed (see section 1.6) in single-occupancy dwellings and domestic garages. Where the floor is to be constructed above a basement, the soffit should be provided with a suitable finish (see section 8.2).

4 Practicability of installation

The product can be installed readily by experienced blockworkers.

5 Thermal transmittance



For the purposes of calculating thermal transmittance (U values), the thermal conductivity should be taken as $0.16 \text{ Wm}^{-1}\text{K}^{-1}$, for protected situations.

6 Condensation risk



6.1 At ground-floor level over a ventilated void, the extent of condensation forming on the upper surface of a floor system will depend upon; the infill block, the finish used and its moisture permeability properties of the surfaces, as well as the air temperature and relative humidity in contact with them.

6.2 Care must be taken to provide adequate ventilation and minimise possible problems resulting in formation of interstitial condensation in the floor.

6.3 For the purposes of condensation risk analysis to BS 5250 : 2002, the product's water vapour resistance factor (μ) may be taken as 10.

7 Concentrated loads



7.1 Loadspans should be determined in accordance with BS 8110-1 : 1997. The following partial safety factors should be included in these determinations:

- dead load partial safety factor 1.4
- imposed load partial safety factor 1.6.

7.2 Laboratory tests on sand grouted Thermalite Floorblocks, incorporating restraint likely to be met in expected use, achieved an ultimate load failure of 19.5 kN when subjected to point loading.

8 Properties in relation to fire



8.1 The blocks are 'non-combustible' as defined in the national Building Regulations (and have a reaction to fire of Class A1 to BS EN 13501-1 : 2007).

8.2 When used above a basement or at upper-floor levels, the ceiling finish must provide fire resistance capable of meeting the requirements of the national Building Regulations.

9 Resistance to the passage of sound



Intermediate floors incorporating the product, within a new dwelling in England and Wales, must incorporate suitable ceilings and floor finishes to limit airborne sound transmission. Constructions achieving an R_w of at least 40 dB are acceptable.

10 Movement

The moisture movement of the blocks may be taken as a nominal value of 0.4 mm.m^{-1} .

11 Maintenance



As the product is confined within a floor space and has suitable durability (see section 1.2) maintenance is not required.

12 Durability



The exposure conditions beneath a suspended floor over a ventilated void and soil with no oversite concrete or other surface seal, are classified as 'mild' in accordance with BS 8110-1 : 1997 (Table 3.2). The Thermalite Floorblocks will have adequate durability for these exposure conditions.

13 Site preparation

13.1 The ground beneath the floor should be free from topsoil and vegetation. Oversite concrete or other surface seal is not required.

13.2 In Scotland, it is considered to be good practice (and also an NHBC and Zurich requirement) that the solum area beneath all suspended floors is brought up at least to the level of adjoining ground. An exception to this is where an arrangement of damp-proof membranes or damp-proof courses is installed to prevent the ingress of groundwater to the solum set at a lower level.

13.3 A void at least 75 mm deep (Zurich require 150 mm for use in Scotland) must be provided between the underside of the floor and the ground surface. With heavy clay soil, the depth should be increased to at least 150 mm to prevent problems associated with heave. With good natural drainage or site drains provided to prevent water collecting and standing, the ground level beneath the floor does not need to be raised to the external ground level but, where the levels differ, the ability of the perimeter walls to act as retaining walls must be checked.

13.4 A continuous damp-proof course should be laid along the support wall below the floor in accordance with CP 102 : 1973 and BS 8215 : 1991.

13.5 Damp-proofing and ventilation arrangements must be in accordance with normal good practice, for example, provision of damp-proof sleeves to ventilators and adequate drainage of the sub-floor (see also section 13.6).

13.6 Ventilators must be provided to the void beneath the floor in the external wall to give a minimum open area per metre run of 600 mm² (Zurich require that where a gas supply passes through the void or occurrence of natural gas is possible, ventilation should be increased to 1500 mm² per metre run).

13.7 In areas where there might be landfill gas or methane, and in areas where full radon precautions are required, a gas-proof barrier must be used. Full details are given in BRE Guidance Documents, BRE Report (BR 211 : 1999) *Radon : Guidance on protective measures for new dwellings*, BRE Report (BR 212 : 1991) *Construction of new building on gas-contaminated land*, BRE Report (BR 376 : 1999) *Radon : Guidance on protective measures for new dwellings in Scotland*, BRE Report (BR 413) *Radon : Guidance on protective measures for new dwellings in Northern Ireland* and BRE Report (BR 414 : 2001) *Protective measures for housing on gas-contaminated land*.

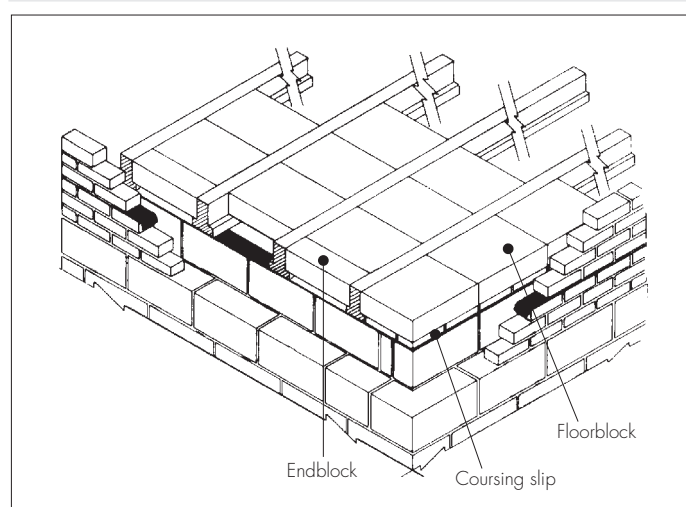
14 Floor installation

14.1 When deciding on the suitability and specification of any beam to be used with the blocks, reference should be made to prestressed concrete beam flooring systems with a current BBA Certificate. The Certificate holder should be consulted and reference should also be made to BS 8110-1 : 1997.

14.2 The beam manufacturer's recommendations for placement and fixing should be followed.

14.3 The Floorblocks should be placed between the ends of the beam units as they are positioned to ensure correct spacing (see Figure 1). Where transmission of sound via a cavity is a consideration, the blocks should be fully bedded and levelled, and the vertical joints filled with mortar.

Figure 1 Typical floor arrangement



14.4 Normally, a whole block is used to bear on the first beam and outside wall of a bay. When this occurs, the block should be bedded on the wall with a normal mortar joint.

14.5 The blocks must be provided with adequate bearing by clearing the beam flanges of debris and ensuring that adjacent blocks are abutted as close as possible.

14.6 The joints between the blocks and beams must not exceed 5 mm and must be grouted. The grout should be a mix of cement/sharp sand (1:4 by volume) and with sufficient water added to produce a plastic consistency. The recommended method of application is by brushing into the joints. Dry grouting may also be used; all joints must be filled, and supervision must be adequate to ensure complete grouting.

14.7 Where the infill is of a non-standard block size (eg next to services), the void can be filled by cutting the blocks to fit. Cutting can be easily undertaken using a masonry handsaw (specialist equipment is not required). The blocks must not be cut or drilled in such a way as to impair their structural performance (advice should be sought from the Certificate holder).

14.8 Care must be taken to avoid overloading the floor during construction. Once it has been fully grouted, it should only be used for short-term materials storage and construction traffic. Planks should be laid across the joists and as close as possible to the floor bearings, before stacking materials.

14.9 The floor should be thoroughly examined prior to the application of the finish and any damaged blocks must be replaced.

14.10 Application of the screed should be strictly in accordance with the relevant recommendations of BS 8204-1 : 2003. See section 15.

15 Incorporation of services

15.1 Services must not be attached to beams or blocks in such a way as to impair their durability or strength.

15.2 Services must be protected from potential damage due to floor movement, eg by wrapping in flexible materials or by ducting. Consideration must be given to the differential movements between the floor beams and other parts of the building and between adjacent beams, particularly where adjacent beams are of different spans.

15.3 Blocks must not be cut to accommodate horizontal services. Horizontal services and conduits can be installed within the depth of the floor finish.

15.4 Vertical service pipes can be accommodated between infill blocks and by reinstating the floor with in-situ concrete.

16 Floor sub-bases

House floors

16.1 A minimum thickness of 50 mm⁽¹⁾ sand/cement (3:1) screed in accordance with BS 8204-1 : 2003 is required.

16.2 The 50 mm thickness sand/cement screed detailed for house floors can be laid directly on the grouted floor and, unless it is particularly moisture sensitive (as described in CP 102 : 1973), a damp-proof membrane need not be laid over the precast floor.

(1) A minimum 65 mm reinforced screed is required if used directly on top of insulation.

Domestic garages

16.3 The screed should be a minimum 50 mm thick concrete with a minimum compressive strength of 20 Nmm⁻². Reference should be made to beam manufacturers with particular regard to beam spacing and the need for reinforcement.

Other flooring sub-bases

16.4 Where flooring sub-bases other than those detailed in sections 16.2 and 16.3 are to be considered, advice must be sought from the Certificate holder.

Technical Investigations

17 Tests

As part of the assessment leading to the issue of the original Certificate:

- tests were carried out to BS 6073-1 : 1981 and BS 6073-2 : 1981, to determine:
 - dimensional accuracy
 - dry density
 - compressive strength
- small test units incorporating Thermalite Floorblocks with appropriate sections of commercially available prestressed concrete floor beams were grouted and subjected to concentrated loading under relevant conditions of partial restraint were witnessed by the BBA
- the results of tests on blocks subjected to static and impact loads were examined.

18 Investigations

As part of the assessment leading to the reissue of this Certificate:

- the manufacturing process for the blocks was examined, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.
- a site visit was carried out to assess:
 - practicability of installation
 - resistance to site handling and site traffic
 - requirements for maintenance and repairs.
- an assessment was made of the risk of condensation for the blocks
- a user survey was conducted to evaluate the performance in use.

Additional Information

The management systems of Hanson Building Products have been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2000 by the British Standards Institution Quality Assurance (Certificate Nos FM 01582 (Birmingham), FM 01678 (Newbury) and FM 01903 (Purfleet).

Bibliography

BS 5250 : 2002 *Code of practice for control of condensation in buildings*

BS 6073-1 : 1981 *Precast concrete masonry units — Specification for precast concrete masonry units*

BS 6073-2 : 1981 *Precast concrete masonry units — Method for specifying precast concrete masonry units*

BS 8110-1 : 1997 *Structural use of concrete — Code of practice for design and construction*

BS 8204-1 : 2003 *Screeds, bases and in-situ floorings — Concrete bases and cement sand levelling screeds to receive floorings — Code of practice*

BS 8215 : 1991 *Code of practice for design and installation of damp-proof courses in masonry construction*

BS EN 771-4 : 2003 *Specification for masonry units — Autoclaved aerated concrete masonry blocks*

BS EN 13501-1 : 2007 *Fire classification of construction products and building elements. Classification using test data from reaction to fire tests*

BS EN ISO 9001 : 2000 *Quality management systems — Requirements*

CP 102 : 1973 *Code of practice for protection of buildings against water from the ground*

19 Conditions

19.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is granted only to the company, firm or person named on the front page — 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.

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

19.3 This Certificate will remain valid for an unlimited period provided that the product/system 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
- are reviewed by the BBA as and when it considers appropriate.

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

- 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 the nature, design, methods and workmanship of or related to the installation
- the actual works in which the product/system is installed, used and maintained, including the nature, design, methods and workmanship of such works.

19.5 Any information relating to the manufacture, supply, installation, use and maintenance 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 and maintained. It does 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; 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. 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 manufacture, supply, installation, use and maintenance of this product/system.