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Agrément Certificate

07/4414

Product Sheet 1

ENERGYSTORE CAVITY WALL INSULATION

GRAPHITE PLUS CAVITY WALL INSULATION

This Agrément Certificate Product Sheet⁽¹⁾ relates to Graphite Plus Cavity Wall Insulation, expanded polystyrene material injected in bead form with or without a bonding agent, for use in external masonry walls up to and including 12 metres in height, with nominal cavity widths not less than 40 mm, in new and existing domestic and non-domestic buildings. The product may also be used in buildings over 12 metres in height where a height restriction waiver has been issued by the Certificate holder.

(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

Thermal properties — the product has a declared thermal conductivity (λ_D) of $0.034 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ (see section 6).

Water resistance — the product will resist the transfer of water across the cavity (see section 7).

Condensation — the product will contribute to limiting the risk of condensation (see section 8).

Behaviour in relation to fire — use of the product does not prejudice the fire resistance properties of the wall (see section 9).

Durability — the product is durable, rot-proof, water resistant and sufficiently stable to remain effective as an insulation for the life of the building (see section 12).



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

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

Date of First issue: 29 April 2014

John Albon — Head of Approvals
Energy and Ventilation

A handwritten signature in black ink, appearing to read 'Claire Curtis-Thomas'.

Claire Curtis-Thomas
Chief Executive

Originally certificated on 14 February 2007

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.

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Regulations

In the opinion of the BBA, Graphite Plus Cavity Wall Insulation, 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: C2(a)	Resistance to moisture
Comment:	The product can contribute to satisfying this Requirement. See section 7.1 of this Certificate.
Requirement: C2(b)	Resistance to moisture
Comment:	The product can contribute to satisfying this Requirement. See section 7.2 of this Certificate.
Requirement: C2(c)	Resistance to moisture
Comment:	The product can contribute to satisfying this Requirement. See sections 8.1 and 8.3 of this Certificate.
Requirement: L1(a)(i)	Conservation of fuel and power
Comment:	The product can contribute to satisfying this Requirement. See sections 6.1 and 6.3 of this Certificate.
Regulation: 7	Materials and workmanship
Comment:	The product is an acceptable material. See section 12.1 and the <i>Installation</i> part of this Certificate.
Regulation: 26	CO₂ emission rates for new buildings
Regulation: 26A	Fabric energy efficiency rates for new dwellings (England only)
Comment:	The product can contribute to satisfying this Regulation. See sections 6.1 and 6.3 of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation: 8(1)	Durability, workmanship and fitness of materials
Comment:	The product can contribute to satisfying this Regulation. See section 12.1 and the <i>Installation</i> part of this Certificate.
Regulation: 9	Building standards applicable to construction
Standard: 2.6	Spread to neighbouring buildings
Comment:	The product is not non-combustible but may be used in walls of domestic and non-domestic buildings in accordance with the exceptions permitted in this Standard, with reference to clauses 2.6.5 ⁽¹⁾ and 2.6.6 ⁽²⁾ . See section 9.5 of this Certificate.
Standard: 3.4	Moisture from the ground
Comment:	The product can contribute to satisfying this Standard, with reference to clause 3.4.1 ⁽¹⁾⁽²⁾ . See section 7.1 of this Certificate.
Standard: 3.10	Precipitation
Comment:	The product will contribute to satisfying this Standard, with reference to clause 3.10.1 ⁽¹⁾⁽²⁾ provided they comply with the conditions set out in section 7.2 of this Certificate.
Standard: 3.15	Condensation
Comment:	The product can contribute to satisfying this Standard, with reference to clauses 3.15.1 ⁽¹⁾⁽²⁾ , 3.15.4 ⁽¹⁾⁽²⁾ and 3.15.5 ⁽¹⁾⁽²⁾ . See sections 8.2 and 8.3 of this Certificate.
Standard: 6.1(b)	Carbon dioxide emissions
Standard: 6.2	Building insulation envelope
Comment:	The product can contribute to satisfying clauses, or parts of, 6.1.1 ⁽¹⁾ , 6.1.2 ⁽²⁾ , 6.1.6 ⁽¹⁾ , 6.2.1 ⁽¹⁾⁽²⁾ , 6.2.3 ⁽¹⁾ , 6.2.4 ⁽²⁾ , 6.2.5 ⁽²⁾ , 6.2.6 ⁽¹⁾ , 6.2.7 ⁽¹⁾ , 6.2.8 ⁽¹⁾⁽²⁾ , 6.2.9 ⁽¹⁾⁽²⁾ , 6.2.10 ⁽¹⁾⁽²⁾ , 6.2.11 ⁽¹⁾⁽²⁾ , 6.2.12 ⁽²⁾ and 6.2.13 ⁽¹⁾⁽²⁾ of these Standards. See sections 6.1 and 6.3 of this Certificate.
Standard: 7.1(a)(b)	Statement of sustainability
Comment:	The product 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. In addition, the product can contribute to a construction meeting a higher level of sustainability as defined in this Standard, with reference to clauses 7.1.4 ⁽¹⁾⁽²⁾ [Aspects 1 ⁽¹⁾⁽²⁾ and 2 ⁽¹⁾], 7.1.6 ⁽¹⁾⁽²⁾ [Aspects 1 ⁽¹⁾⁽²⁾ and 2 ⁽¹⁾] and 7.1.7 ⁽¹⁾⁽²⁾ [Aspect 1 ⁽¹⁾⁽²⁾]. See section 6.1 of this Certificate.
Regulation: 12	Building standards applicable to conversions
Comment:	All comments given for this product 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

Regulation: 23	Fitness of materials and workmanship
Comment:	The product is an acceptable material. See section 12.1 and the <i>Installation</i> part of this Certificate.
Regulation: 28(a)	Resistance to moisture and weather
Comment:	The product can contribute to satisfying this Regulation. See section 7.1 of this Certificate.
Regulation: 28(b)	Resistance to moisture and weather

Comment:	The product can contribute satisfying this Regulation. See section and 7.2 of this Certificate.
Regulation:	29 Condensation
Comment:	The product will contribute to satisfying this Regulation. See section 8.3 of this Certificate.
Regulation:	39(a)(i) Conservation measures
Regulation:	40(2) Target carbon dioxide emission rate
Comment:	The product can contribute to satisfying these Regulations. See sections 6.1 and 6.3 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 section: 3 *Delivery and site handling* (3.1) of this Certificate.

Additional Information

NHBC Standards 2014

NHBC accepts the use of Graphite Plus Cavity Wall Insulation, other than in very severe exposure locations with fair-faced masonry, provided it is installed, used and maintained in accordance with this Certificate, in relation to *NHBC Standards, Chapter 6.1, External masonry walls*.

Technical Specification

1 Description

1.1 Graphite Plus Cavity Wall Insulation is a grey expanded polystyrene bead material, for use as an injected insulation with or without a water based PVA bonding agent within the cavity of masonry cavity walls. The bonding agent is used to adhere the beads together and provide long-term stability to the insulation.

1.2 The target mean density of this product when installed is $12 \text{ kg}\cdot\text{m}^{-3}$ over the entire installation. Individual areas within the wall must not have an absolute density variation of more than $\pm 2 \text{ kg}\cdot\text{m}^{-3}$ from the target mean density when measured over an area of 0.5 m^2 .

2 Manufacture

2.1 The raw material is fed into an expander and heated by steam, which causes expansion of the bead to a controlled density.

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

3 Delivery and site handling

3.1 The product is delivered to site in polythene sacks or bulk containers and may be marked with the BBA identification mark incorporating the number of this Certificate. The material, which has an indefinite storage life, should be kept dry and away from heat sources.

3.2 The bonding agent is water based and is delivered to site in containers marked with the BBA identification mark incorporating the number of this Certificate.

3.3 The bonding agent must be protected from frost, high temperatures and direct sunlight. Containers should be stored inside and off the ground at a temperature between 2°C and 30°C . It must not be used beyond its 'use-by date' or allowed to freeze at any time.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Graphite Plus Cavity Wall Insulation.

4 General

4.1 Graphite Plus Cavity Wall Insulation is satisfactory for use as an injected cavity wall insulation and is effective in reducing the thermal transmittance (U value) of external cavity walls with masonry inner and outer leaves (where masonry includes clay and calcium silicate bricks, concrete blocks, natural and reconstituted stone blocks). The product is for use in new and existing domestic and non-domestic buildings up to and including 12 metres in height, with cavity widths not less than 40 mm. It is essential that such walls are designed and constructed to incorporate the precautions given in this Certificate to prevent moisture penetration.

4.2 This Certificate covers the use of the product in the following hard to treat (HTT) applications:

- a cavity less than 50 mm wide (see section 4.3 of this Certificate)
- a partially filled cavity (see section 4.7 of this Certificate)
- a building in excess of three storeys (see section 20 of this Certificate).

4.3 This Certificate covers the use of the product in any exposure zone, subject to the following conditions being met. They are particularly important in areas subject to severe or very severe driving rain:

- a site survey should be carried out prior to installation (see sections 13 and 15)
- the minimum cavity width must be not less than 40 mm
- walls must be in a good state of repair and show no evidence of frost damage
- mortar joints must not show evidence of more than hairline cracking. Raked or recessed mortar joints should be avoided in very severe exposure areas.

4.4 The NHBC does not accept the use of full fill insulation in very severe exposure locations with fair-faced masonry.

Partial filling — omitted areas

4.5 Partial filling of the gable apex (ie limiting the fill to several brickwork courses above ceiling level) is permitted provided the top of the wall is protected by the roof and:

- the roof void is not an occupied space
- the loft insulation is at ceiling level.

4.6 Partial filling is also allowed when:

- separately insulating semi-detached or terraced properties. The cavity barrier used for this purpose is retained in the cavity and must be as defined in section 18.3
- filling up to the underside of a horizontal boundary, other than the roof, where that horizontal boundary is protected by a cavity tray or similar waterproof barrier
- treating properties where the wall to be insulated is below a waterproof cladding (eg tile hung) and this cladding either extends up to the roof or is protected at the top by other means (eg window sills)
- treating areas of wall where access for drilling may be limited by features such as carports and conservatories as defined in sections 19.10 and 19.11.

Partial fill — residual cavities⁽¹⁾

4.7 This Certificate covers the use of the product for topping up of residual cavities in partial fill installations, subject to the following conditions being met:

- prior to installation, a site survey is carried out by a BBA Approved Assessor (see section 14)
- the existing built-in insulation in the cavity is one of the following:
 - mineral wool (MW) batts
 - expanded polystyrene (EPS) boards
 - foil-faced polyisocyanurate (PIR), polyurethane (PUR) or phenolic (PF) boards
- the minimum residual cavity width is not less than 40 mm
- installation is carried out by a BBA Approved Installer, trained to work on this type of installation
- all other conditions in section 4.3 are met.

(1) Partial fill installations relate to existing constructions where insulation, in the form of batts or boards, has previously been built into a wall and there is a residual cavity.

Existing buildings

4.8 In an existing building, the product may be installed only:

- where there are no signs of dampness on the inner face of the cavity wall, other than those caused solely by condensation, and
- where the cavity is not being used as a source of combustion air or as a flue for ventilation purposes.

New buildings

4.9 New buildings subject to the national Building Regulations should be constructed in accordance with the relevant recommendations of:

- BS 8000-3 : 2001
- BS EN 1996-1-1 : 2005, BS EN 1996-1-2 : 2005, BS EN 1996-2 : 2006 and BS EN 1996-3 : 2006 and their UK National Annexes.

4.10 Other new buildings not subject to regulatory requirements should also be built in accordance with the Standards identified in section 4.9 of this Certificate.

4.11 In a new building where the product is to be installed:


- cavity battens or boards must be used to reduce the amount of mortar droppings left in the cavity
- injection of the product should be left until the cavity is sealed from the weather, ie the roof is in place and the window and door openings sealed.

5 Practicability of installation

The product must be installed by operatives trained and approved by the Certificate holder and subsequently approved by the BBA. The Certificate holder operates an Approved Installer Scheme⁽¹⁾ for this product under which the installers are approved, registered and regularly reviewed by the Certificate holder to demonstrate that they are competent to carry out installations of the product in accordance with this Certificate. Details of Approved Installers are available from the Certificate holder. Approved Installers are responsible for each installation of the product that they undertake (see section 16).

(1) The Certificate holder's records relating to their Approved Installer Scheme will be audited annually by the BBA as part of its programme of surveillance.

6 Thermal properties

 6.1 Calculations of the thermal transmittance (U value) of specific external wall constructions should be carried out in accordance with BS EN ISO 6946 : 2007 and BRE Report BR 443 : 2006, using the insulation's declared thermal conductivity (λ_D) of 0.034 W·m⁻¹·K⁻¹.

6.2 Where an existing wall is subject to national Building Regulations, for example a material change of use, designers should take account of the relevant guidance relating to technical and economic feasibility and target U values in the documents supporting those Regulations.


 6.3 The U value of a typical brick and block cavity wall construction will depend on the cavity width and the insulating value of the internal block leaf and finish. Calculated U values for example constructions are given in Table 1 for existing buildings and Table 2 for new buildings.

Table 1 Example cavity wall U values⁽¹⁾ — existing/retained walls

Cavity width/ insulation thickness (mm)	U values (W·m ⁻² ·K ⁻¹)	
	13 mm dense plaster ⁽²⁾ 100 mm dense block ⁽³⁾	Plasterboard on dabs 100 mm AAC block ⁽⁴⁾
40	0.63	0.43
50	0.53	0.38
75	0.38	0.30
100	0.30	0.24
125	0.24	0.21

(1) Assumes fixings correction for fully penetrating mild steel fixings (50 W·m⁻¹·K⁻¹) at 2.5 per m² with cross sectional area of 12.5 mm² nominal U value and 102 mm thick brick outer leaf.

(2) Plaster thermal conductivity 0.57 W·m⁻¹·K⁻¹.

(3) Block and mortar thermal conductivity 1.13 W·m⁻¹·K⁻¹ and 0.88 W·m⁻¹·K⁻¹ respectively.

(4) Block and mortar thermal conductivity 0.12 W·m⁻¹·K⁻¹ and 0.88 W·m⁻¹·K⁻¹ respectively.

Table 2 Example cavity wall U values⁽¹⁾ — new buildings

U value requirement (W·m ⁻² ·K ⁻¹)	U values (W·m ⁻² ·K ⁻¹)	
	13 mm dense plaster ⁽²⁾ 100 mm dense block ⁽³⁾	Plasterboard on dabs 100 mm AAC block ⁽⁴⁾
0.19	165	140
0.25	120	95
0.26	115	90
0.27	110	85
0.30	100	75
0.35	85	60

(1) Assumes fixings correction for fully penetrating stainless steel fixings (17 W·m⁻¹·K⁻¹) at 2.5 per m² with cross sectional area of 12.5 mm² nominal U value and 102 mm thick brick outer leaf.

(2) Plaster thermal conductivity 0.57 W·m⁻¹·K⁻¹.

(3) Block and mortar thermal conductivity 1.13 W·m⁻¹·K⁻¹ and 0.88 W·m⁻¹·K⁻¹ respectively.

(4) Block and mortar thermal conductivity 0.12 W·m⁻¹·K⁻¹ and 0.88 W·m⁻¹·K⁻¹ respectively.

Junctions

6.4 The product can maintain, or contribute to maintaining, continuity of thermal insulation at junctions between elements and openings. For Accredited Construction Details, the corresponding ψ -values (Psi) in BRE Information Paper IP 1/06, Table 3, may be used in carbon emission calculations in Scotland and Northern Ireland. Detailed guidance for other junctions and on limiting heat loss by air infiltration can be found in:

England and Wales — Approved Documents to Part L and, for new thermal elements to existing buildings, Accredited Construction Details (version 1.0). See also SAP 2009 Appendix K and the *iSBEM User Manual* for new-build

Scotland — Accredited Construction Details (Scotland)

Northern Ireland — Accredited Construction Details (version 1.0).

7 Water resistance



7.1 The product can be used in situations where it bridges the damp-proof course (dpc) in walls; dampness from the ground will not pass through to the inner leaf provided the wall is detailed in accordance with the requirements and provisions in the documents supporting the national Building Regulations:

England and Wales — Approved Document C, section 5

Scotland — Mandatory Standard 3.4, clause 3.4.1⁽¹⁾⁽²⁾

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — Technical Booklet C, Sections 6.3 to 6.6.

7.2 When the product is properly installed in accordance with this Certificate, it will resist any water transfer across the cavity to the inner leaf.

8 Condensation

Surface condensation



8.1 Walls will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed $0.7 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$ at any point and the junctions with other elements are designed in accordance with the guidance referred to in section 6.4 of this Certificate.



8.2 For buildings in Scotland, constructions will be acceptable where the thermal transmittance (U value) does not exceed $1.2 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$ at any point and the junctions with other elements are designed in accordance with the guidance referred to in BS 5250 : 2011, Annex G. Further guidance may be obtained from BRE Report BR 262 : 2002 and section 6.4 of this Certificate.

Interstitial condensation



8.3 Walls will adequately limit the risk of interstitial condensation when they are designed and constructed in accordance with BS 5250 : 2011, Annexes D and G and the relevant guidance.

9 Behaviour in relation to fire

9.1 The use of the product does not prejudice the fire resistance properties of the wall. It is unlikely to become ignited within the cavity when used in the context of this Certificate. If fire does penetrate into the cavity, the amount of air present will be insufficient to support combustion. However, the instructions contained in this Certificate relating to the sealing of an uncapped cavity (section 15.3) and the removal of any insulant present in the loft space after installation (section 19.11), must be carefully followed.

9.2 The requirements of the national Building Regulations relating to fire spread in cavity walls can be met in buildings of all purpose groups without the need for cavity barriers, provided the construction complies with the provisions detailed in:

England and Wales — Approved Document B, Volume 1, Diagram 13 and Volume 2, Diagram 34

Northern Ireland — Technical Booklet E, Diagram 4.5.

9.3 For buildings subject to the Building Standards in Scotland, cavity barriers are not required to limit the area of a cavity or at junctions with other wall cavities. However, cavity barriers are required around openings, penetrations and junctions with roof or floor cavities, with reference to clauses 2.4.1⁽¹⁾⁽²⁾, 2.4.2⁽¹⁾⁽²⁾, 2.6.5⁽¹⁾ and 2.6.6⁽²⁾.

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

9.4 For constructions not covered by sections 9.2 and 9.3 cavity barriers must be provided to comply with:

England and Wales — Approved Document B, Volume 1, Section 6 and Volume 2, Section 9

Scotland — Mandatory Standard 2.4, clauses 2.4.1⁽¹⁾⁽²⁾ and 2.4.2⁽¹⁾⁽²⁾

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — Technical Booklet E, Paragraphs 4.36 to 4.39.



9.5 The product is not classified as 'non-combustible' but may be used in a wall on or less than 1 metre from a relevant boundary when it is installed in a cavity that is between two leaves of masonry at least 75 mm thick, and which has a cavity barrier around all openings in the wall and at the top of the wall-head.

10 Proximity of flues and appliances

When installing the product in close proximity to certain flue pipes and/or heat producing appliances, the relevant provisions of the national Building Regulations are applicable:

England and Wales — Approved Document J

Scotland — Mandatory Standard 3.19, clause 3.19.1⁽¹⁾

(1) Technical Handbook (Domestic).

Northern Ireland — Technical Booklet L.

11 Maintenance

As the product is confined within the wall cavity and has suitable durability (see section 12), maintenance is not required.

12 Durability



12.1 The product is unaffected by the normal conditions in a wall, and it is durable, rot-proof, water resistant and sufficiently stable to remain effective as insulation for the life of the building.

12.2 Should it become necessary for any reason, the product can be evacuated from the cavity void.

Installation

13 Site assessment

13.1 Prior to the installation, an assessment must be carried out by a trained assessor, who may also be the installing technician, to ascertain the suitability of the property or properties to receive Graphite Plus Cavity Wall Insulation. An assessment report is prepared and held at the installer's offices. Particular problems are specifically identified and any reasons for rejection of the work noted. Care should be taken at this stage for the assessor and the party commissioning the work to identify, and agree in writing as appropriate, any areas of the wall that will not be filled (see section 19.10 and 19.11) and any special requirements for making good (see section 19.8).

13.2 Assessment of hard to treat (HTT) properties must be carried out by a member of the BBA Approved Assessor Scheme for Assessing the Suitability of Buildings for the Installation of Cavity Wall Insulation (see section 14). The assessment of partial fill cavities requires additional checks, as detailed in BBA Policy 18: *Requirements for Surveying of Hard to Treat Cavity Walls*⁽¹⁾.

(1) Available on the BBA website, www.bbacerts.co.uk.

14 Approved Assessors

All assessors of HTT properties must be BBA-approved, and registered with the BBA as part of the BBA Approved Installer and Assessor schemes. The BBA will monitor all Approved Assessors as part of the surveillance operated over BBA Approved Installers. BBA Inspectors will audit installation records during the annual office inspection to ensure that all HTT cavities have been filled in accordance with the relevant system Certificate including, where appropriate, that the property has been surveyed by an Approved Assessor.

15 Site preparation

15.1 The installing operative ensures that the property has been correctly assessed and is suitable for insulation with the product. Any problems encountered during installation which prevent compliance with this Certificate are referred to the installation company before proceeding.

15.2 Essential ventilation openings, such as those providing combustion air or underfloor ventilation, and all flues in the cavity wall must be checked. If adequate sleeving or other cavity closures are not present, installation must not proceed until these openings have been sleeved or otherwise modified to prevent blockage by the insulant.

15.3 Wherever practicably possible, all uncapped cavity walls must be sealed prior to installation, for example, with plugs of mineral fibre.

16 Approved installers

Installation of the product is carried out by the Certificate holder or their Approved Installers. An Approved Installer is defined as a company:

- required to satisfy an initial site installation check by the BBA following approval by the Certificate holder, and is subject to the BBA Assessment and Surveillance Scheme for Installation of Cavity Wall Insulation
- approved by the Certificate holder and the BBA to install the product
- having undertaken to comply with the Certificate holder's installation procedure

- employing technicians who have been issued with appropriate identity cards by the Certificate holder; at least one member of each installation team must carry a card
- subject to inspections by the Certificate holder, who oversees the activities of Approved Installers. It is a requirement that the Certificate holder undertakes inspections of each card-carrying technician using their products, and maintains records, as detailed in the *BBA Assessment and Surveillance Scheme for BBA Approved Installers of Cavity Wall Insulation*.

17 Supervision

17.1 Installation of the product should be carried out in accordance with the *BBA Assessment and Surveillance Scheme for Installation of Cavity Wall Insulation*.

17.2 During installation, the following simple checks can be made, as an aid to determining that the installation conforms to the certificated method:

- the pattern of holes complies with the description given in section 19.1
- injection of material takes place in each hole, to complete the filling of the cavity space.

18 General

18.1 The installation of the product is undertaken using injection equipment, based on a compressed air delivery system, tested and accepted for use with this product by the BBA.

18.2 The installer provides all necessary hoses, drilling tools, equipment and materials for making good the walls after the installation.

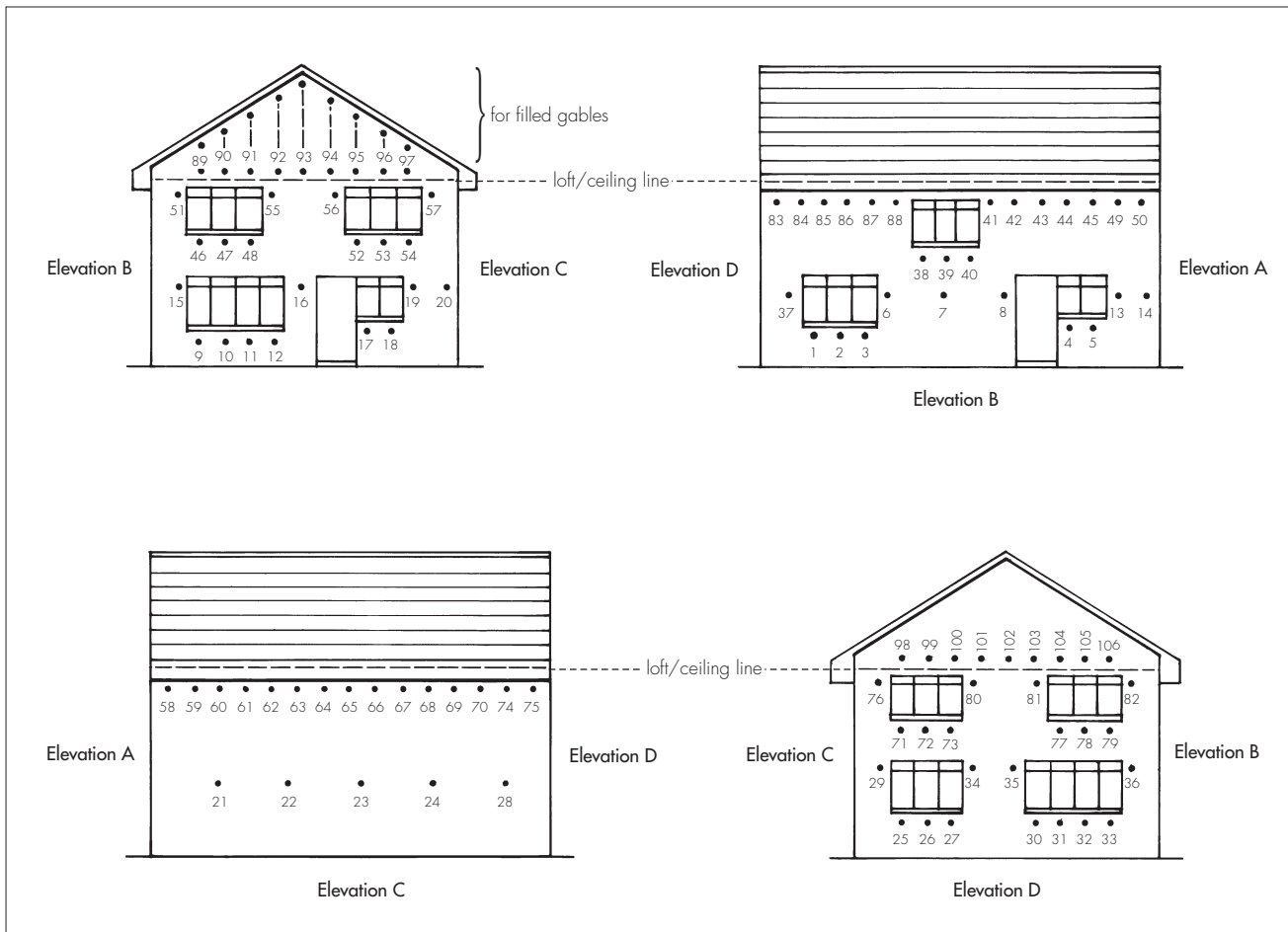
18.3 Where a semi-detached or terraced property is to be insulated, a cavity brush is inserted at the line dividing the properties to contain the insulation. This consists of a continuous polypropylene brush which is left in place when the installation is completed.

19 Procedure

Standard nozzle

19.1 Holes of 22 mm or 26 mm diameter are drilled between bricks at the junction of the horizontal and vertical mortar joints. Sufficient injection holes must be drilled to ensure that the cavity will be completely filled without voids. The holes are normally spaced not more than 700 mm horizontally apart and the top row of holes in each wall is not more than 300 mm from the top of the wall. A similar series of holes is drilled below windows and obstructions and, if found to be necessary, along the lines of the roof slope at gable ends. Alternatively, a series of holes is drilled approximately 700 mm horizontally apart and 200 mm above the highest ceiling level. A further series of holes (2.0 m apart) is drilled at the middle height of a two-storey building to ensure complete fill of the cavity space. Care should be taken that these holes do not coincide with the intermediate suspended timber floor. A typical drilling pattern is shown in Figure 1.

Figure 1 Typical drilling pattern



19.2 Additional holes should be drilled between windows, doors and other obstacles where necessary. It is important to ensure chimneys and flues are not obstructed by the installation of the product, the correct functioning of these should be checked once the installation is complete.

19.3 To prevent debris falling onto the insulation installation should not start until the drilling has been completed on each elevation.

19.4 Installation should be conducted in accordance with the drilling pattern shown in Figure 1 and should take place from the lowest injection holes up, with the product installed into the upper holes only after all of the lower holes have been filled, and that the insulation does not fill into the roof space.

Directional nozzle

19.5 The procedure for topping up residual cavities in partial fill installations (see section 4.6) is as described in sections 19.1 to 19.4, using a directional aperture nozzle and a slightly amended drilling pattern as described below to avoid any damage to the existing insulation in the cavity.

19.6 Holes of 22 mm or 26 mm diameter are drilled in the outer leaf normally spaced approximately 600 to 650 mm horizontally apart and 200 mm above the highest ceiling level. With respect to a two storey building a further series of holes are drilled 1000 mm to 1100 mm apart at 1.5 m from the dpc level and another series of holes are drilled 1000 mm to 1100 mm apart at 3 m from the dpc level. A similar series of holes is drilled below windows and obstructions. A typical drilling pattern is shown in Figure 2.

19.7 Where the apex of the gable end wall is to be insulated a series of holes is drilled along the line of the eaves approximately 600 to 650 mm apart and 200 mm below the soffit line and also below any window in the gable in the same way as described for other windows. A further row of holes are drilled mid-level between the top of the apex and the wall plate level approximately 600 to 650 mm apart.

Figure 2 Partial fill drilling pattern



Finishing

19.8 After injection, the drill holes are fully filled with mortar of a similar type, colour, texture and weathertightness as that of the existing wall. Where a wall requires a high degree of colour matching, the level of finish matching should be agreed in writing during the site assessment. All trunked air vents eg those providing underfloor ventilation and combustion air for heating appliances are checked – any obstructions must be cleared. All flues must be carefully checked by an appropriate test (eg a smoke test) to verify that they are clear and unobstructed.

19.9 Insulant blown through the top of the cavity into the loft space is removed and any points of leakage sealed (see section 15.3).

Omitted areas

19.10 In some circumstances access for drilling injection holes and filling with insulation may be limited by features such as carports, conservatories, cladding or tiling, irrespective of whether the standard or directional nozzle is used. The practicability of safely accessing and making good these areas, or installing the insulation through the inner leaf, may outweigh the benefits of insulating these areas.

19.11 It is permissible to omit such areas only when:

- a full justification detailing the reasons to omit areas is included in the survey report
- the assessor obtains written consent for omitting any areas of the wall from the party commissioning the work. The assessor must inform the commissioning party in writing, that heat loss through uninsulated areas will not be reduced and that they will also be subject to a slightly higher risk of condensation.

20 Height restriction waivers

20.1 Graphite Plus Cavity Wall Insulation is for use in buildings up to and including 12 metres in height, in domestic and non-domestic buildings. The product may also be used in buildings over 12 metres in height where a height restriction waiver has been issued by the Certificate holder.

20.2 The Certificate holder has a detailed programme for the assessment of buildings over 12 metres, as approved and maintained under surveillance by the BBA. Each installation beyond 12 metres must be individually assessed by the Certificate holder against this agreed assessment programme and documented approval given prior to the commencement of work.

21 Tests

Results of tests were assessed to determine:

- resistance to rain penetration of an insulated cavity wall
- adequacy of fill using specified installation machinery and drilling pattern
- thermal conductivity
- characterisation of the product.

22 Investigations

22.1 Existing data on toxicity, durability and properties in relation to fire were evaluated.

22.2 The Certificate holder's training arrangements were evaluated.

22.3 An assessment of the practicability of installation was carried out.

22.4 A condensation risk analysis was carried out.

22.5 A series of U value calculations was carried out.

22.6 A calculation was undertaken to confirm the thermal conductivity (λ_D).

22.7 An assessment of the product suitability for topping up of residual cavities in partial fill installations.

23 Other investigations

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

Bibliography

BS 5250 : 2011 *Code of practice for control of condensation in buildings*

BS 8000-3 : 2001 *Workmanship on building sites — Code of practice for masonry*

BS EN 1996-1-1 : 2005 *Eurocode 6 — Design of masonry structures — General rules for reinforced and unreinforced masonry structures*

NA to BS EN 1996-1-1 : 2005 *UK National Annex to Eurocode 6 — Design of masonry structures — General rules for reinforced and unreinforced masonry structures*

BS EN 1996-1-2 : 2005 *Eurocode 6 — Design of masonry structures — General rules — Structural fire design*

NA to BS EN 1996-1-2 : 2005 *UK National Annex to Eurocode 6 — Design of masonry structures — General rules — Structural fire design*

BS EN 1996-2 : 2006 *Eurocode 6 — Design of masonry structures — Design considerations, selection of materials and execution of masonry*

NA to BS EN 1996-2 : 2006 *UK National Annex to Eurocode 6 — Design of masonry structures — Design considerations, selection of materials and execution of masonry*

BS EN 1996-3 : 2006 *Eurocode 6 — Design of masonry structures — Simplified calculation methods for unreinforced masonry structures*

NA to BS EN 1996-3 : 2006 *UK National Annex to Eurocode 6 — Design of masonry structures — Simplified calculation methods for unreinforced masonry structures*

BS EN ISO 6946 : 2007 *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*

BRE Information Paper IP 1/06 *Assessing the effects of thermal bridging at junctions and around openings*

BRE Report (BR 262 : 2002) *Thermal insulation : avoiding risks*

BRE Report (BR 443 : 2006) *Conventions for U-value calculations*

24 Conditions

24.1 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.

24.2 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.

24.3 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.

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

24.5 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.

24.6 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.