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**Agrément Certificate**

**16/5343**

Product Sheet 5

**CELOTEX INSULATION**

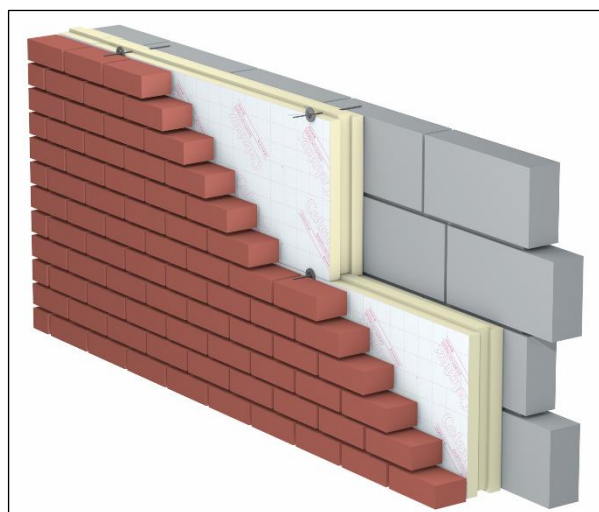
**THERMACLASS CAVITY WALL 21 FOR FULL FILL CAVITY WALLS**

This Agrément Certificate Product Sheet<sup>(1)</sup> relates to ThermaClass Cavity Wall 21 for Full Fill Cavity Walls, comprising foil-faced rigid polyisocyanurate (PIR) foam board, for use as full fill thermal insulation in new external masonry cavity walls up to 25 metres in height in domestic and non-domestic buildings (additional requirements apply for buildings above 12 metres). The product is installed during construction.

(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 performance** — the product has a declared thermal conductivity ( $\lambda_D$ ) of  $0.021 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$  (see section 6).

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

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

**Behaviour in relation to fire** — the product has a reaction to fire classification of Class E to BS EN 13501-1 : 2007 and its use is restricted in some cases (see section 9).

**Durability** — the product is durable, rot proof, water resistant and sufficiently stable to remain effective as 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

Date of First issue: 13 May 2021

Hardy Giesler  
Chief Executive Officer

*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](http://www.bbacerts.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.*

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## Regulations

In the opinion of the BBA, Thermoacclass Cavity Wall 21 for Full Fill Cavity Walls, 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)

<b>Requirement:</b>	<b>B3(4)</b>	<b>Internal fire spread (structure)</b>
Comment:		The product is restricted by this Requirement. See sections 9.1 and 9.3 of this Certificate.
<b>Requirement:</b>	<b>B4(1)</b>	<b>External fire spread</b>
Comment:		The product is restricted by this Requirement in some cases. See sections 9.1 and 9.3 of this Certificate.
<b>Requirement:</b>	<b>C2(a)</b>	<b>Resistance to moisture</b>
Comment:		The product can contribute to satisfying this Requirement. See section 7.1 of this Certificate.
<b>Requirement:</b>	<b>C2(b)</b>	<b>Resistance to moisture</b>
Comment:		The product can contribute to satisfying this Requirement. See section 7.2 of this Certificate.
<b>Requirement:</b>	<b>C2(c)</b>	<b>Resistance to moisture</b>
Comment:		The product can contribute to satisfying this Requirement. See sections 8.1 and 8.4 of this Certificate.
<b>Requirement:</b>	<b>L1(a)(i)</b>	<b>Conservation of fuel and power</b>
Comment:		The product can contribute to satisfying this Requirement. See sections 6.1 and 6.2 of this Certificate.
<b>Regulation:</b>	<b>7(1)</b>	<b>Materials and workmanship</b>
Comment:		The product is acceptable. See section 12 and the <i>Installation</i> part of this Certificate.
<b>Regulation:</b>	<b>7(2)</b>	<b>Materials and workmanship</b>
Comment:		The product is restricted by this Regulation. See sections 9.1 and 9.2 of this Certificate.
<b>Regulation:</b>	<b>26</b>	<b>CO<sub>2</sub> emission rates for new buildings</b>
<b>Regulation:</b>	<b>26A</b>	<b>Fabric energy efficiency rates for new dwellings (applicable to England only)</b>
<b>Regulation:</b>	<b>26A</b>	<b>Primary energy consumption rates for new buildings (applicable to Wales only)</b>
<b>Regulation:</b>	<b>26B</b>	<b>Fabric performance values for new dwellings (applicable to Wales only)</b>
Comment:		The product can contribute to satisfying these Regulations. See sections 6.1 and 6.2 of this Certificate.



### The Building (Scotland) Regulations 2004 (as amended)

<b>Regulation:</b>	<b>8(1)</b>	<b>Durability, workmanship and fitness of materials</b>
Comment:		The product is acceptable. See section 12 and the <i>Installation</i> part of this Certificate.
<b>Regulation:</b>	<b>9</b>	<b>Building standards applicable to construction</b>
Standard:	<b>2.4</b>	<b>Cavities</b>
Comment:		The product is restricted by this Standard, with reference to clause 2.4.2 <sup>(1)(2)</sup> . See sections 9.1 and 9.4 of this Certificate.

Standard:	2.6	Spread to neighbouring buildings
Comment:		The product is restricted by this Standard in some cases, with reference to clauses 2.6.5 <sup>(1)</sup> and 2.6.6 <sup>(2)</sup> . See sections 9.1 and 9.4 of this Certificate.
Standard:	3.4	Moisture from the ground
Comment:		The product can contribute to satisfying this Standard, with reference to clauses 3.4.1 <sup>(1)(2)</sup> and 3.4.5 <sup>(1)(2)</sup> . See section 7.1 of this Certificate.
Standard:	3.10	Precipitation
Comment:		The product can contribute to satisfying this Standard, with reference to clauses 3.10.1 <sup>(1)(2)</sup> and 3.10.3 <sup>(1)(2)</sup> , provided it complies 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 <sup>(1)(2)</sup> , 3.15.4 <sup>(1)(2)</sup> and 3.15.5 <sup>(1)(2)</sup> . See sections 8.1 and 8.5 of this Certificate.
Standard:	6.1(b)	Carbon dioxide emissions
Standard:	6.2	Building insulation envelope
Comment:		The product can contribute to satisfying these Standards, with reference to clauses, or parts of, 6.1.1 <sup>(1)</sup> , 6.1.2 <sup>(2)</sup> , 6.1.6 <sup>(1)</sup> , 6.2.1 <sup>(1)(2)</sup> , 6.2.3 <sup>(1)</sup> , 6.2.4 <sup>(2)</sup> , 6.2.5 <sup>(2)</sup> , 6.2.9 <sup>(1)</sup> , 6.2.10 <sup>(1)</sup> , 6.2.11 <sup>(1)(2)</sup> and 6.2.13 <sup>(2)</sup> . See sections 6.1 and 6.2 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 <sup>(1)(2)</sup> [Aspects 1 <sup>(1)(2)</sup> and 2 <sup>(1)</sup> ], 7.1.6 <sup>(1)(2)</sup> [Aspects 1 <sup>(1)(2)</sup> and 2 <sup>(1)</sup> ] and 7.1.7 <sup>(1)(2)</sup> [Aspect 1 <sup>(1)(2)</sup> ]. See section 6.1 of this Certificate.
<b>Regulation:</b>	<b>12</b>	<b>Building standards applicable to conversions</b>
Comment:		Comments in relation to the product under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1 <sup>(1)(2)</sup> and Schedule 6 <sup>(1)(2)</sup> .

(1) Technical Handbook (Domestic).  
(2) Technical Handbook (Non-Domestic).



## The Building Regulations (Northern Ireland) 2012 (as amended)

<b>Regulation:</b>	<b>23</b>	<b>Fitness of materials and workmanship</b>
Comment:		The product is acceptable. See section 12 and the <i>Installation</i> part of this Certificate.
<b>Regulation:</b>	<b>28(a)</b>	<b>Resistance to moisture and weather</b>
Comment:		The product can contribute to satisfying this Regulation. See section 7.1 of this Certificate.
<b>Regulation:</b>	<b>28(b)</b>	<b>Resistance to moisture and weather</b>
Comment:		The product can contribute to satisfying this Regulation. See section 7.2 of this Certificate.
<b>Regulation:</b>	<b>29</b>	<b>Condensation</b>
Comment:		The product can contribute to satisfying this Regulation. See section 8.1 of this Certificate.
<b>Regulation:</b>	<b>35(4)</b>	<b>Internal fire spread — structure</b>
Comment:		The product is restricted by this Regulation. See sections 9.1 and 9.3 of this Certificate.
<b>Regulation:</b>	<b>36(a)</b>	<b>External fire spread</b>
Comment:		The product is restricted by this Regulation. See sections 9.1 and 9.3 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 6.2 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* (3.4) of this Certificate.

### Additional Information

#### NHBC Standards 2021

In the opinion of the BBA, and other than in very severe exposure locations with fair-faced masonry, Thermaclass Cavity Wall 21 for Full Fill Cavity Walls, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards*, Chapter 6.1 *External masonry walls*.

#### CE marking

The Certificate holder has taken the responsibility of CE marking the product in accordance with harmonised European Standard BS EN 13165.

### Technical Specification

#### 1 Description

1.1 Thermaclass Cavity Wall 21 for Full Fill Cavity Walls comprises rigid polyisocyanurate (PIR) foam boards with a trilaminate foil facing on both sides, with the nominal characteristics given in Table 1.

*Table 1 Nominal characteristics*

Length (mm)	1205 overall (1190 nominal)
Width (mm)	465 overall (450 nominal)
Thicknesses (mm)	65 to 140
Edge profile	15 mm tongue and groove (4 edges)

1.2 The boards have tongue-and-groove edging on all four sides, enabling the boards to interlock when installed (see Figures 1 and 2).

*Figure 1 Board dimensions*

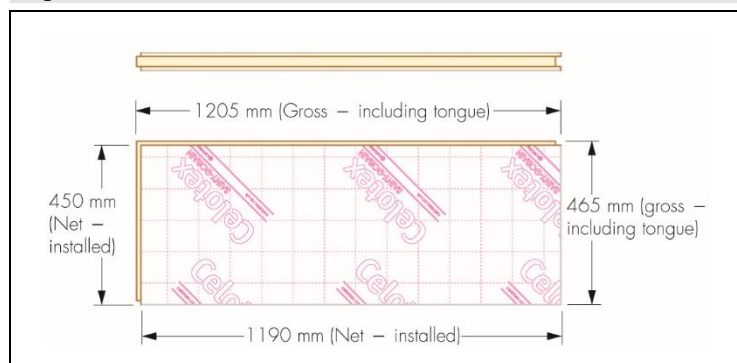
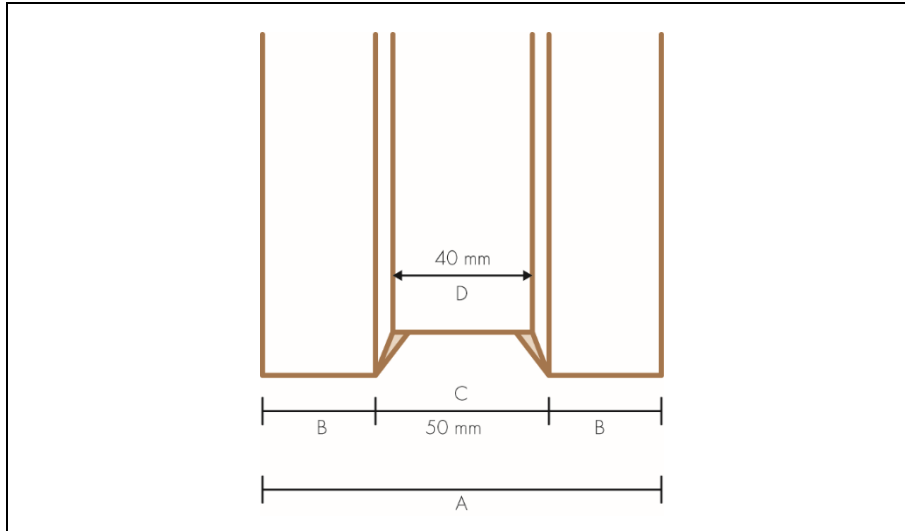


Figure 2 Edge groove profile and nominal dimensions<sup>(1)</sup>



Board thickness mm (A)	65	90	115	140
Outer edges mm (B)	7.5	20	32.5	45
Outer groove mm (C)	50	50	50	50
Inner groove mm (D)	40	40	40	40

(1) Groove nominal depth and tongue nominal height are 15 mm. The tongue is sized to fill the groove.

## 2 Manufacture

2.1 Celotex PIR insulation is manufactured by a lamination process formed between foil-facings that are continuously laminated using a mixture of two primary chemicals, polyol and MDI and a blowing agent. The board is then cut to its finished size and packed.

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 non-conformities
- 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.

2.3 The management system of Celotex has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2015 and BS EN ISO 14001 : 2015 by SGS UK Ltd (Certificate GB91/504 and GB11/83526 respectively).

## 3 Delivery and site handling

3.1 The product is delivered to site in polythene-wrapped packs. Each pack of boards contains a label with the Certificate holder's name, board dimensions and the BBA logo incorporating the number of this Certificate.

3.2 The product must be protected from prolonged exposure to sunlight, and stored dry, flat and raised above ground level (to avoid contact with ground moisture). Where possible, packs should be stored inside. If stored outside, they should be under cover, or protected with opaque polythene sheeting.

3.3 The product is light and easy to handle; care should be taken to avoid crushing the edges or corners. If damaged, the product should be discarded.

3.4 The product must not be exposed to open flame or other ignition sources, or to solvents or other chemicals.

## Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Thermaclass Cavity Wall 21 for Full Fill Cavity Walls.

### Design Considerations

#### 4 Use

4.1 Thermaclass Cavity Wall 21 for Full Fill Cavity Walls is satisfactory for use as full fill cavity wall insulation (with no cavity or a residual cavity of up to 10 mm) 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, and natural and reconstituted stone blocks). The product is for use in new domestic and non-domestic buildings up to and including 25 metres in height (although additional requirements apply above 12 metres in height). Further restrictions on height may apply based on the reaction to fire classification – see section 9 of this Certificate. It is essential that such walls are designed and constructed to incorporate the precautions in this Certificate to prevent moisture penetration.

4.2 This Certificate covers the use of the product in any exposure zone. However, use of the product does not preclude the need to apply an external render coat or other suitable finish in severe exposure zones where such application would be normal practice.

4.3 As with other forms of cavity wall insulation, where buildings need to comply with *NHBC Standards*, specifiers should observe the requirements of that document.

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

- 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 respective UK National Annexes
- BS EN 845-1 : 2013 and BS 8000-3 : 2001.

4.5 Other new buildings, not subject to regulatory requirements, should also be built in accordance with the Standards identified in section 4.4 of this Certificate.

4.6 Cavity wall ties (with insulation-retaining fixings if using residual cavity) and, if required, any additional ties to BS EN 845-1 : 2013 and PD 6697 : 2019 should be used for structural stability in accordance with BS EN 1996-1-1 : 2005, BS EN 1996-2 : 2006 and BS EN 1996-3 : 2006.

4.7 Care must be taken in the overall design and construction of walls incorporating the product to ensure the provision of appropriate:

- cavity trays and damp-proof courses (dpc)
- cavity barriers and fire dampers
- resistance to the ingress of precipitation, moisture and dangerous gases from the ground
- resistance to sound transmission when flanking separating walls and floors.

#### **Buildings over 12 m high and up to and including 25 m high**

4.8 Where the walls of a building are between 12 and 25 m high, the following requirements also apply:

- from ground level, the maximum height of continuous cavity must not exceed 12 m. Above 12 m, the maximum height of a continuous cavity must not exceed 7 m. In both cases, breaks should be in the form of continuous horizontal cavity trays and weep holes discharging to the outside
- the area to be insulated must not be an infill panel in a framed structure
- the Certificate holder, in association with the architect, must carry out a detailed programme of assessment of the project, including an examination of the quality of installation as work progresses. Above average site supervision is recommended during installation.

## 5 Practicability of installation

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

## 6 Thermal performance



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 : 2017 and BRE Report BR 443 : 2006, using the following values:

- PIR insulation — declared thermal conductivity ( $\lambda_D$ ) of  $0.021 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$
- composite foil-facings both sides, printed on one side only — for both facers, an aged emissivity ( $\epsilon_D$ ) (to BS EN 15976 : 2011) of 0.05.

6.2 The U value of a completed wall will depend on the selected insulation thickness, the number and type of fixings, and the insulating value of the substrate masonry and its internal finish. Calculated U values for example constructions are given in Table 2.

Table 2 Example U values – full fill insulation<sup>(1)</sup>

Design U value ( $\text{W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$ )	Insulation thickness (mm)	
	100 mm dense block with 13 mm dense plaster <sup>(2)</sup>	100 mm AAC block Plasterboard on dabs <sup>(3)</sup>
0.12	-	140
0.13	140	140
0.17	115	90
0.18	115	90
0.20	90	90
0.21	90	90
0.22	90	65
0.23	90	65
0.25	90	65
0.26	65	65
0.27	65	65
0.28	65	65
0.30	65	65
0.35	65	65

(1) The U value calculations are based on the following:

- wall ties: stainless steel ( $\lambda = 17 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ ), 2.5 per  $\text{m}^2$ ,  $12.5 \text{ mm}^2$  cross-section
- 102 mm brick ( $\lambda = 0.77 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ )
- 10 mm low e cavity

(2) 100 mm dense block ( $\lambda = 1.13 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ ) bridged by mortar (6.6%,  $\lambda = 0.88 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ ) and 13 mm dense plaster ( $\lambda = 0.57 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ )

(3) 100 mm AAC block ( $\lambda = 0.12 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ ) bridged by mortar (6.6%,  $\lambda = 0.88 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ ) and 12.5 mm plasterboard ( $\lambda = 0.25 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ ) on 15 mm dabs (20%,  $\lambda = 0.43 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ ).

### Junctions

6.3 Care must be taken in the overall design and construction of junctions with other elements and openings to minimise thermal bridges and air infiltration. Detailed guidance can be found in the documents supporting the national Building Regulations.

## 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 of the national Building Regulations.



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.

7.3 In all situations, it is particularly important to ensure during installation that:

- wall ties are installed correctly and are thoroughly clean
- excess mortar is cleaned from the cavity face of the leading leaf and any debris removed from the cavity
- mortar droppings are cleaned from the exposed edges of installed boards
- insulation boards are properly installed and butt-jointed
- installation is carried out to the highest level on each wall, or the top edge of the insulation is protected by a cavity tray
- at lintel level, a cavity tray, stop ends and weep holes are provided
- cavity battens and/or boards are used during construction to prevent bridging by mortar droppings
- dpc at ground level does not project into the cavity, as it can form a trap for mortar bridging
- raked or recessed mortar joints are avoided in very severe exposure areas.

7.4 Window and door opening reveals should be constructed incorporating a cavity barrier/closer/dpc, as required.

7.5 Wall corners are to be constructed incorporating a vertical dpc as noted in section 14.11.

## 8 Condensation risk

### Interstitial condensation



8.1 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.

8.2 The foil-facings have a water vapour resistance of  $1000 \text{ MN}\cdot\text{s}\cdot\text{g}^{-1}$  and the insulation core has a water vapour resistivity of  $300 \text{ MN}\cdot\text{s}\cdot\text{g}^{-1}\cdot\text{m}^{-1}$  and, therefore, will provide significant resistance to water vapour transmission. Joints between boards will facilitate the passage of water vapour under normal conditions of temperature and humidity.

8.3 If the product is to be used in the external walls of rooms expected to have high humidity, care must be taken to provide adequate permanent ventilation to avoid possible problems from the formation of interstitial condensation.

### Surface condensation



8.4 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 6.3 of this Certificate.



8.5 For buildings in Scotland, wall constructions will be acceptable when 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 6.3 of this Certificate.

## 9 Behaviour in relation to fire



9.1 The product has a reaction to fire classification<sup>(1)</sup> of E to BS EN 13501-1 : 2007.

(1) Warringtonfire, Report no WF 432188 (Issue 1), 2 November 2020. Copies can be obtained from the Certificate holder.



9.2 In England and Wales, the product should not be used on buildings that have a storey 18 m or more above ground level and which contain: one or more dwellings, an institution, a room for residential purposes (excluding any room in a hostel, hotel or boarding house), student accommodation, care homes, sheltered housing, hospitals or dormitories in boarding schools.





9.3 In England, Wales and Northern Ireland, the product is unrestricted in terms of proximity to a boundary and, for constructions comprising two leaves of brick or concrete each at least 75 mm thick and with cavities closed around openings and at the top of the wall (with cavity barriers in Northern Ireland), is unrestricted in terms of height, other than those buildings described in section 9.2. For other constructions, the product should not be used in buildings with a floor more than 18 m above the ground.



9.4 In Scotland, the product may be used without restriction on height or proximity to a relevant boundary, provided 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. For other constructions, the product should not be used 1 m or less from a boundary or in a building with a floor more than 11 m above the ground and cavity barriers must be provided.

9.5 Designers should refer to the relevant national Building Regulations and guidance for detailed conditions of use, particularly in respect of requirements for substrate fire performance, cavity closers and barriers, fire stopping of service penetrations and combustibility limitations for other materials and components used in the overall wall construction.

## 10 Proximity of flues and appliances

Detailed guidance can be found in the documents supporting the national Building Regulations for the provisions that are applicable when the system is installed in close proximity to certain flue pipes and/or heat-producing appliances.

## 11 Maintenance

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

## 12 Durability



The product is durable, rot-proof, water-resistant and sufficiently stable to remain effective as insulation for the life of the building.

## Installation

### 13 General

13.1 The product should be stored, handled and installed in accordance with the Certificate holder's instructions and this Certificate.

13.2 It is recommended that the inner leaf is constructed ahead of the outer leaf, as the boards are restrained to the cavity face of the inner leaf. It is essential that the spacing of wall ties/clips allows one long edge of each full-length board to be secured at a minimum of two points.

13.3 Vertical joints in the boards must be staggered and all joints tightly butted. Where protrusions occur in the cavity, the boards should be carefully cut to fit.

13.4 If installation of the boards is terminated below the highest level of the wall, the top edge of the insulation must be protected by a cavity tray and alternate perpendicular joints raked out, to provide adequate drainage of water from the tray.

13.5 Where required, door and window reveals should incorporate a suitable cavity barrier/closer. It is recommended that BBA-approved cavity closers are used.

## 14 Procedure

14.1 A section of the inner leaf is built, with the first row of wall ties at approximately 600 mm horizontal spacing where the insulation is to begin. The wall ties should not be placed directly on the dpc. The first run of boards should commence a minimum of 150 mm below the dpc level to provide some edge insulation for the floor. The boards must fit flush against the internal leaf, maintaining up to a 10 mm residual cavity where specified between the insulation board and the external wall leaf.

14.2 The leading leaf is then built up to the required height, with wall ties placed at a vertical spacing of 450 mm, ensuring the drip of the tie is located halfway across the cavity width. Excess mortar should be cleaned from the cavity face of the leading leaf, and the boards placed on the wall ties behind the retaining clips (where a residual cavity is used), to form a closely butt-jointed run.

14.3 The second row of wall ties is fitted to retain the tops of the boards. It is essential that all wall ties slope downwards towards the outer leaf (see Figures 3 and 4) and are placed at centres not exceeding 900 mm<sup>(1)</sup>, to ensure that each board is secured at a minimum of three points. It is also important that the first row of insulation boards is not in contact with the ground or all board edges are sealed.

(1) Where buildings need to comply with NHBC Standards, the spacing should be no more than 600 mm.

Figure 3 Wall ties with residual cavity

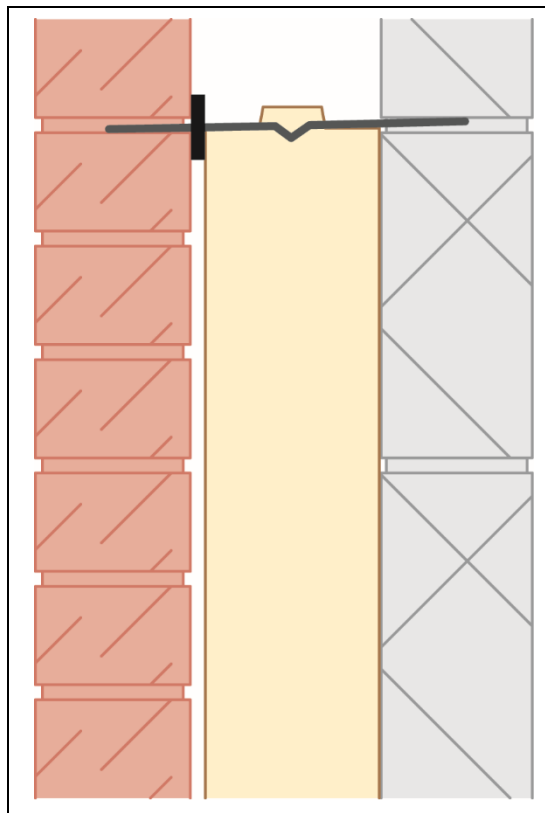
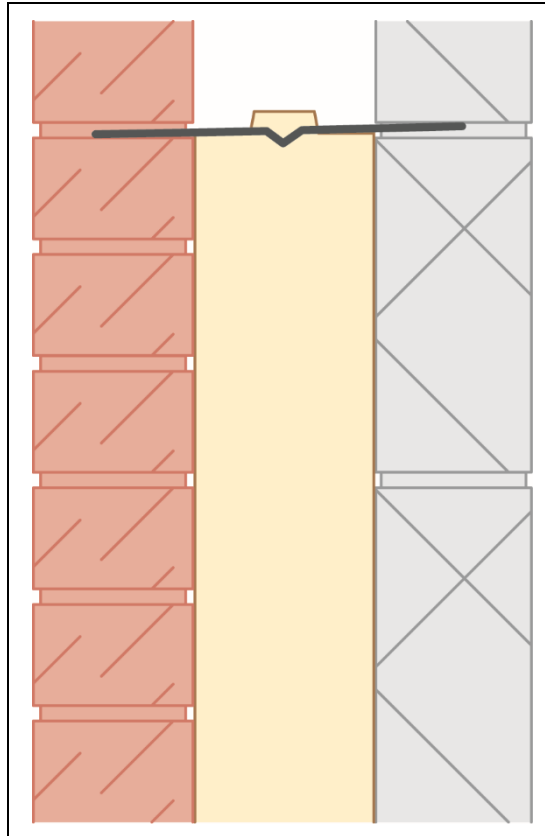


Figure 4 Wall ties without residual cavity



14.4 Additional ties may be required to satisfy the structural requirements of BS EN 845-1 : 2013, BS EN 1996-1-1 : 2005, BS EN 1996-2 : 2006 and BS EN 1996-3 : 2006 to ensure adequate retention of boards or cut pieces.

14.5 The other leaf is built up to the level of the top of the boards.

14.6 All boards should be interlocked , with vertical joints staggered. Insulation boards and wall ties should be staggered as construction proceeds and carried up to the highest level of the wall, except where protected by a cavity tray. All boards require slots to be cut in the top tongue, to allow for placement of the wall ties (including insulation retainers).

#### **Mortar droppings**

14.7 After each section of the leading leaf is built, excess mortar should be removed from the cavity face and mortar droppings cleaned from exposed edges of the installed board, before installation of the next run of boards. Use of a cavity board or a cavity batten will protect the installed board edges and help to keep the cavity clean as the following leaf is built.

#### **Corners**

14.8 Boards should be arranged in a 'blocking' arrangement, as shown in Figure 5, to ensure staggered corner edge joints. The boards at the corner should be butt-jointed. All presenting edges must be flush-cut by removing, at minimum, the groove or tongue. It is important that all cuts are accurate to ensure all edges are butted tightly with no air gaps, thus achieving continuity of the thermal envelope around the corners (see Figures 6, 7 and 8). If the tongue of the board is exposed at the corner edge, this should be removed using a sharp specialist insulation saw or insulation knife (see bottom row corner board in Figure 5). There is no need to cut or fill the groove of the board when it is exposed at the corner edge.

Figure 5 Corner board blocking arrangement



Figure 6 External corner detail

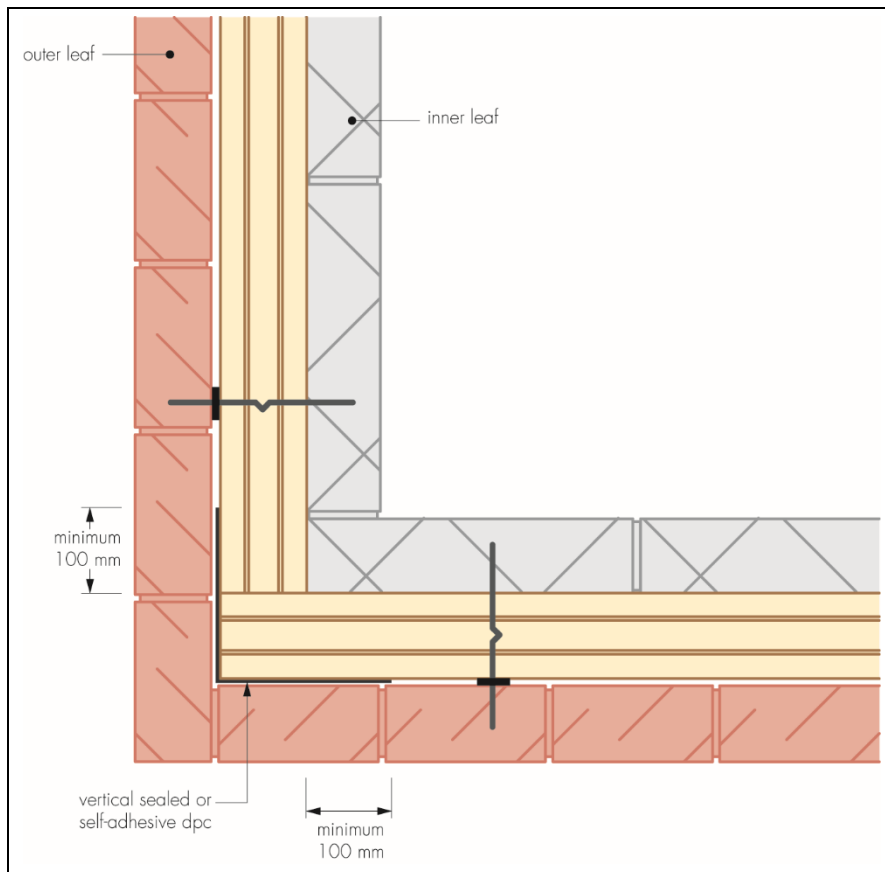


Figure 7 Internal corner detail

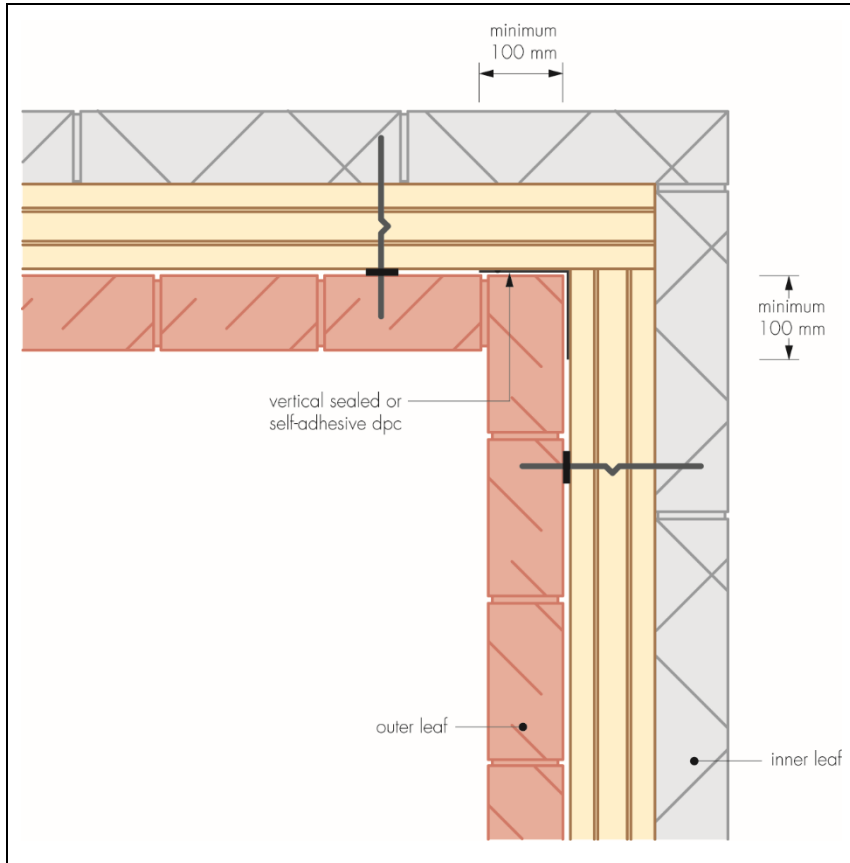
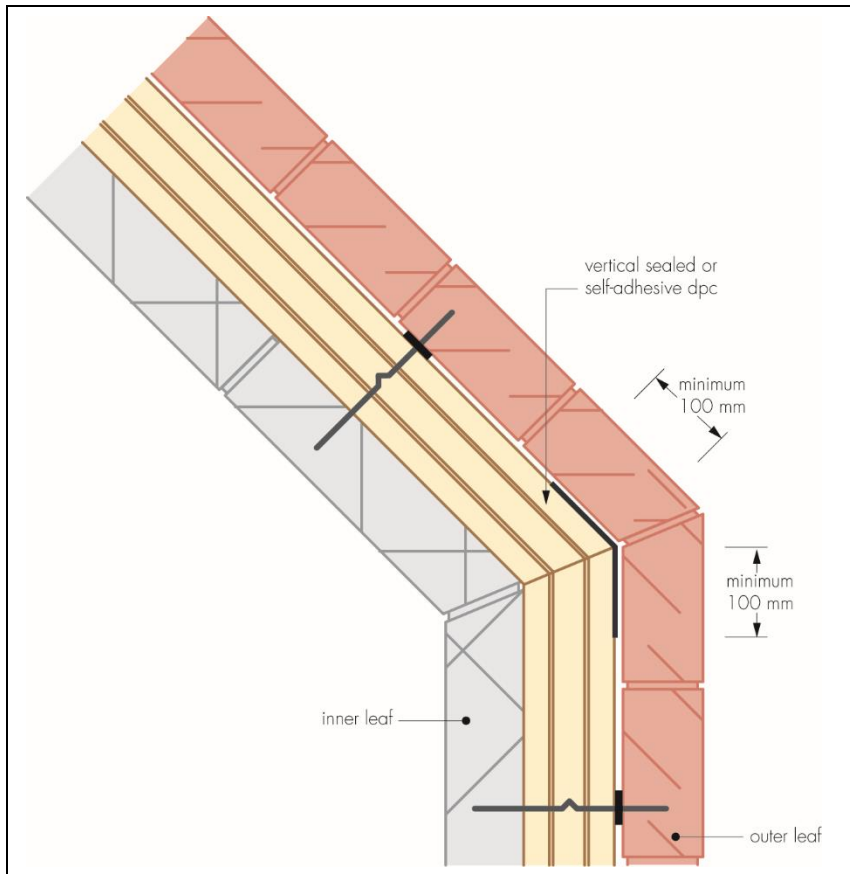
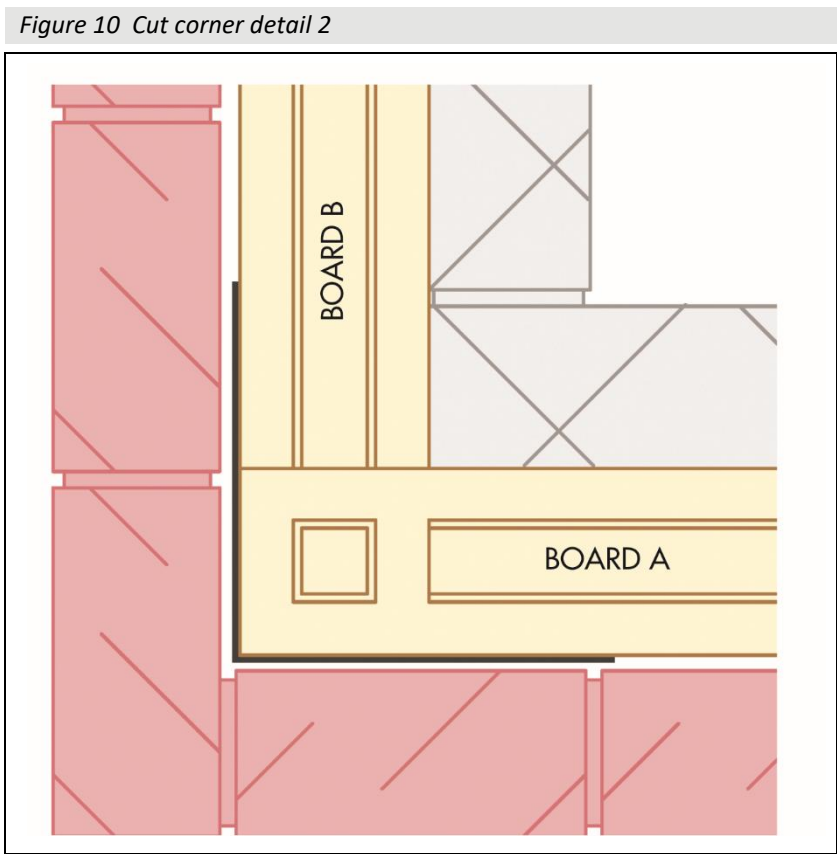
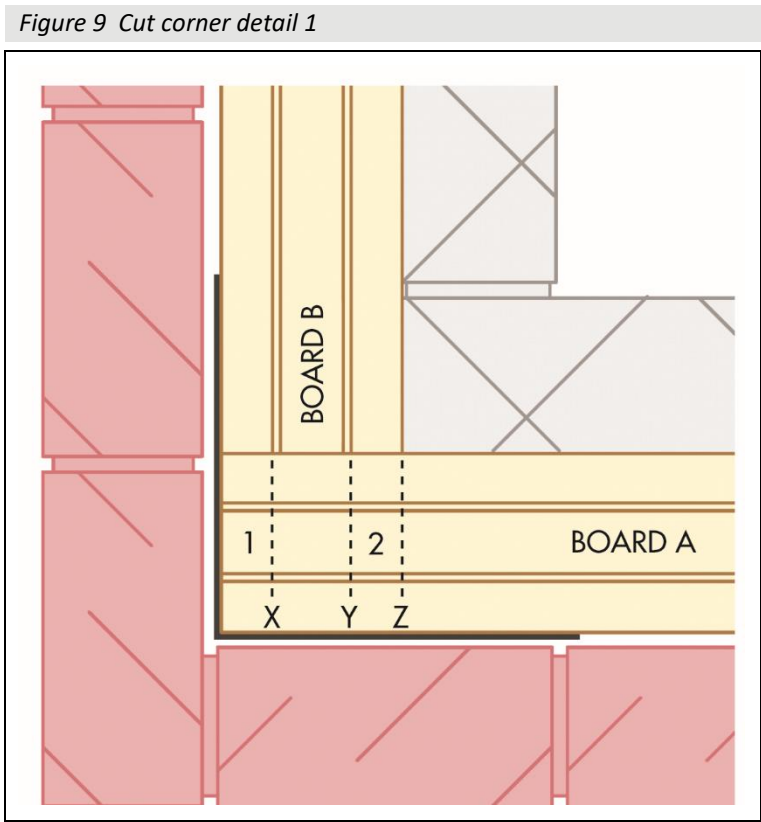


Figure 8 Mitred corner detail



14.9 Where the boards 'interlock' as part of the blocking arrangement, a section of the tongue at the top of the lower board should be cut and removed, to ensure a flush fit with the board above. The tongue of board A should be cut and the sections of the tongue removed (areas 1 and 2 on Figure 9), leaving a 'residual rectangle' of tongue (see Figure 10). Note: the cuts will have to be angled to reflect the tapered shape of the tongue (the top of the tongue is 40 mm wide, the bottom is 50 mm wide). This will allow the overlapping tongue and groove edges of the upper and lower boards to provide a flush fit at the corner junction.



14.10 When positioning the corner boards in a blocking arrangement, it is important to maintain the staggered pattern (detailed in section 14.8) required to avoid vertical joints on each row. Corner boards should be cut to size where necessary, taking into consideration the butt-joint, to achieve this.

14.11 All corner details should incorporate a vertical sealed or self-adhesive dpc with a minimum 100 mm overlap beyond the board ends at all courses (see Figures 6, 7 and 8). To achieve this overlap, the width of the dpc should be selected based on the thickness of the board being installed.

### Wall openings

14.12 Where openings such as doors and windows are in close proximity, it is recommended that a continuous lintel or cavity tray is used. Individual lintels or cavity trays should have stop ends and be adequately drained. Insulation boards should be cut to butt tightly against the cavity barrier/closer/dpc.

### Cut pieces

14.13 The product can be cut using a sharp knife or fine-toothed saw to fit openings, eg around windows, doors and airbricks. It is essential that cut pieces completely fill the spaces for which they are intended and are adequately secured.

### Protection

14.14 Exposed areas of boards should always be covered at the end of a day's work or in driving rain.

14.15 All building involving the product, particularly interrupted work, must conform to BS EN 1996-2 : 2006, Sections 3.2 *Acceptance, handling and storage of materials* and 3.6 *Curing and protective procedures during execution*.

## Technical Investigations

### 15 Tests

Results of tests were assessed to determine:

- thermal conductivity
- emissivity
- effect on the water resistance of the cavity wall with the slabs installed (full-fill).

### 16 Investigations

16.1 An examination of data was made to analyse:

- thermal conductivity
- dimensional accuracy
- compressive strength
- dimensional stability under specific temperature and humidity conditions
- water absorption
- water vapour transmission
- reaction to fire.

16.2 A condensation risk analysis was carried out.

16.3 A series of U value calculations was carried out.

16.4 A calculation was undertaken to confirm the declared thermal conductivities.

16.5 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.



## Bibliography

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### 17 Conditions

#### 17.1 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.

17.2 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.

17.3 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.

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

17.5 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.

17.6 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.