

CERTIFICATE TEMPLATE
(STANDARD CERTIFICATE)

Internal use only:

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Agrément Certificate No 08/

PRODUCT SHEET 1 – Kooltherm K15 Rainscreen insulation board

[FRONT PAGE PICTURE – CERTIFICATE HOLDER TO SUPPLY SUITABLE COLOUR IMAGE]

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to Kooltherm K15 Rainscreen insulation board, an insulation product comprising rigid phenolic board with foil composite facings, for use as external thermal insulation on new and existing steel frame or masonry walls in conjunction with masonry or weathertight ventilated cladding systems, in domestic and non domestic buildings up to 18m.

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 Performance – the boards will contribute to a wall achieving design U values that are specified for meeting a buildings Target Emission Rate and can also contribute to limiting heat loss at junctions and around openings (see section 5).

Condensation risk – The boards have a water vapour resistance of 100 MN.s/g. They can contribute to reducing the risk of surface and interstitial condensation (see section 6).

Behaviour in relation to fire – The product will not contribute to the development stages of a fire or present a smoke or toxic hazard (see section 7).

Durability – The boards will have a life equivalent to that of the wall structure in which they are incorporated (see section 14).

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The BBA has awarded this Agrément Certificate for Kooltherm K15 Rainscreen insulation board to Kingspan Insulation Ltd as fit for its intended use provided it is installed, used and maintained as set out in this Agrément Certificate.

On behalf of the British Board of Agrément

Date of First issue:.....

Head of Approvals – Physics

Chief Executive

Regulations

In the opinion of the BBA, Kingspan K15 Rainscreen insulation board, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements of the following Building Regulations:

[E+W MAP] The Building Regulations 2000 (as amended) (England and Wales)

Requirement:	C2(c)	Resistance to moisture
Comment:		The boards can contribute to minimising the risk of surface and interstitial condensation. See section 6.1 and 6.3 of this Certificate.
Requirement:	L1(a)(i)	Conservation of fuel and power
Comment:		The boards can contribute to meeting this Requirement. See sections 5.3 to 5.6 of this Certificate.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The system is acceptable. See section 13 and the <i>Installation</i> part of this assessment.

[S MAP] The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Fitness and durability of materials and workmanship
Comment:		The boards can contribute to a construction satisfying this regulation. See sections 12 and 13 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building Standards - construction
Standard:	3.15	Condensation
Comment:		When used in conjunction with an appropriate vapour control layer the boards will be unrestricted under this Standard, with reference to clauses 3.15.1 ⁽¹⁾⁽²⁾ , 3.15.3 ⁽¹⁾⁽²⁾ and 3.15.4 ⁽¹⁾⁽²⁾ . See sections 6.2 and 6.3 of this Certificate.
Standard:	6.1(b)	Carbon dioxide emissions
Standard:	6.2	Building insulation envelope
Comment:		The boards 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 ⁽¹⁾⁽²⁾ , 6.2.5 ⁽¹⁾⁽²⁾ and 6.2.6 ⁽²⁾ of these Standards. See section 5.3 to 5.6 of this Certificate. (1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic)

[NI MAP] The Building Regulations (Northern Ireland) 2000 (as amended)

Regulation:	B2	Fitness of materials and workmanship
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Comment:		The boards are acceptable. See section 13 and the <i>Installation</i> part of this Certificate.
Regulation:	B3(2)	Suitability of certain materials
Comment:		The boards are acceptable. See section 12 of this Certificate.
Regulation:	C5	Condensation
Comment:		The boards are acceptable. See section 6.3 of this Certificate.
Regulation:	F2(a)(i)	Conservation measures
Comment:		The boards can contribute to meeting this Regulation. See sections 5.3 to 5.6 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: *2 Delivery and site handling (2.3 and 2.4)*

Non-regulatory Information

NHBC Standards 2007

NHBC accepts the use of Kooltherm K15 Rainscreen insulation board, when installed and used in accordance with this Certificate, in relation to *NHBC Standards*, Chapter 6.1 *Thermal Insulation* and Chapter 6.9 *Curtain walling and cladding*. Current NHBC guidance precludes the use of façade systems which do not utilise a drained cavity.

Zurich Building Guarantee Technical Manual 2007

In the opinion of the BBA, Kooltherm K15 Rainscreen insulation board, when installed and used in accordance with this Certificate, satisfies the requirements of the *Zurich Building Guarantee Technical Manual*, Section 4 *Superstructure*, Sub-section *External walls – Render, Curtain walling / cladding*.

General

This Certificate relates to Kooltherm K15 Rainscreen insulation boards supplied by the Certificate holder to create a warm frame wall construction with a ventilated cavity and a weatherproof cladding system/protective rainscreen or for use against masonry substrates.

Weather resistance is provided by an external cladding system which introduces a ventilated cavity to the external face of the product.

Technical Specification

1 Description

1.1 Kooltherm K15 Rainscreen insulation board is a rigid phenolic insulation core with composite foil on both sides, for use as an insulation panel between the studs of steel frame or masonry building systems which are clad with a rainscreen cladding maintaining a cavity to ensure drainage.

1.2 The product is available in the following sizes:

Length (mm)	2400
Width (mm)	1200
Thickness (mm)	25 to 100

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Density (Kg.m⁻³) 40 - 42

2 Delivery and site handling

2.1 The product name and product lot number are printed on each board. Boards are delivered to the site with cardboard to protect the edges. Each pack is labelled with the manufacturer's name, product name, board dimensions, product code, production lot numbers and the BBA logo incorporating the number of this Certificate.

2.2 Where possible, packs should be stored inside. If stored outside, they should be off the ground on a clean, dry, level surface and under cover to protect against moisture and mechanical damage.

2.3 Where large volumes are stored, particularly if indoors, flammable materials and ignition sources should not be permitted in the vicinity.

2.4 Contact with solvent-based wood preservatives, coal tar and its derivatives (eg creosote), paint thinners and solvents (toluene, white spirit), should be avoided.

2.5 The boards must not be exposed to naked flame or other ignition sources.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Kooltherm K15 Rainscreen insulation board.

Design Considerations

3 General

3.1 The products will be effective in reducing the U value (thermal transmittance) of walls.

3.2 Care must also be taken in the overall design and construction of elements incorporating the products to ensure appropriate:

- Sheathing or bracing for frame elements. The products must not be relied on to provide any structural contribution, eg racking strength.
- Fire resistance, for both elements and junctions.
- Cavity barriers and fire dampers.
- Resistance to the ingress of precipitation and moisture from the ground

3.3 When specifying very wide cavities or deep frames, non standard products and detailing solutions may need to be considered.

3.4 Where buildings need to comply with *NHBC Standards 2007* or *Zurich Building Guarantee Technical Manual 2007*, designers should observe the relevant requirements.

3.5 External cavity walls with masonry inner and outer leaves (masonry includes clay and calcium silicate bricks, concrete blocks, natural and reconstituted stone blocks) should be designed and constructed in accordance with the relevant recommendations of:

- BS 5628-3 : 2005. In particular, Clause 5.5 of the Code of Practice Exclusion of water should be followed in that the designer should select a construction appropriate to the local wind-driven rain index, paying due regard to the design detailing, workmanship and materials to be used⁽¹⁾
- BS 8000-3 : 2001.

(1) The construction and detailing should comply with good practice as described in BBA joint publication *Cavity Insulation of Masonry Walls — Dampness Risks and How to Minimise them*. They are particularly important in areas subject to severe driving rain.

3.6 Cavity battens and/or boards may be used to prevent mortar droppings compromising the air tightness of joints between the boards.

3.7 From ground level the maximum height of continuous cavity walls must not exceed 12 m; above 12 m the maximum height of continuous cavity wall must not exceed 7 m. In both cases, breaks should be in the form of continuous horizontal cavity trays and weepholes discharging to the outside. Installation must be carried out to the highest level in each wall unless the top edge of the installation is protected by a cavity tray.

3.8 The product is for use in any exposure zone provided a clear residual cavity width of at least 50 mm is maintained. However, this 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.

3.9 The product may be used with other types of wall construction, eg rainscreen, curtainwall, closed panel, etc. The circumstances of application for these types are not within the scope of the present certificate and other requirements may apply.

3.10 The boards are for use in any exposure zone, subject to conditions being met and the construction being deemed suitable.

3.11 The wall or sub-frame to which the insulation is fixed should be structurally sound and constructed in accordance with the requirements of the relevant national Building Regulations and Standards.

3.12 Masonry or concrete to which the support work and cladding are fixed should be structurally sound and have been constructed in accordance with one or more of the following technical specifications:

- BS 5628-1 : 2005 and BS 5628-3 : 2005
- BS 8110-1 : 1997 and BS 8110-2 : 1985
- the national Building Regulations:

England and Wales — Approved Document A1/2, Section 2C

Scotland — Mandatory Standard 1.1, clauses 1.1.1⁽¹⁾⁽²⁾, 1.1.2⁽¹⁾⁽²⁾ and 1.1.3⁽¹⁾⁽²⁾

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — Technical Booklet D.

3.13 Galvanized steel framework should be structurally sound and designed and constructed in accordance with BS 5950-5 : 1998

4 Practicability of installation

The product can be installed easily by operatives experienced with this type of product. Installation in accordance with the Certificate holder's instructions has to be strictly followed.

5 Thermal performance

5.1 Calculations of the thermal transmittance (U value) of specific external wall constructions should be carried out in accordance with BS EN ISO 6946 : 1997 and BRE⁽¹⁾ report (BR 443 : 2006) *Conventions for U-value calculations*, using the declared thermal conductivity (90/90 value) of the boards are shown in Table 1. The U value of a typical wall construction will depend on the insulating value of the wall and its finish.

Table 1 – Declared thermal conductivity values

(1) Building Research Establishment.

5.2 The boards are placed on the outside of the steel frame or masonry substrate and additional insulation may be required in order to meet thermal requirements.

[ALL MAP] 5.3 The boards can contribute to achieving the following design U values:

England and Wales and Northern Ireland

- 0.35 Wm⁻²K⁻¹ required for 'notional' dwellings in SAP 2005 and buildings other than dwellings in SBEM (see also section 5.2)
- 0.35 Wm⁻²K⁻¹ limit average specified in Approved Documents L1A (Table 2) and L2A (Table 4), and Technical Booklets F1 (Table 2.2) and F2 (Table 2.4) (see also section 5.2)
- 0.70 Wm⁻²K⁻¹ limit for an individual element specified in Approved Documents L1A (Table 2) and L2A (Table 4), Technical Booklets F1 (Table 2.2) and F2 (Table 2.4).

Scotland

- 0.20 Wm⁻²K⁻¹ required for the 'simplified approach – solid fuel package 6' 'notional' dwelling in Mandatory Standard 6.1, clause 6.1.6⁽¹⁾
- 0.25 Wm⁻²K⁻¹ required for 'notional' dwellings in SAP 2005 (for Scotland) and the 'simplified approach – packages 1 to 5' in Mandatory Standard 6.1, clause 6.1.6⁽¹⁾
- 0.30 Wm⁻²K⁻¹ limit average specified in Mandatory Standard 6.2, clause 6.2.1⁽¹⁾⁽²⁾
- 0.70 Wm⁻²K⁻¹ limit for an individual element specified in Mandatory Standard 6.2, clause 6.2.1⁽¹⁾⁽²⁾.

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic)

5.4 Where a proposed wall U value is not better than (or is greater than in Scotland) the relevant 'notional' value specified in section 5.3, additional energy saving measures will be required in the building envelope and/or services to achieve the required overall carbon dioxide emission rate reduction of about 20% in dwellings (18% to 25% in Scotland) and 23% to 28% in buildings other than dwellings.

5.5 The boards can maintain or contribute to maintaining continuity of thermal insulation at junctions between the external wall and the other building elements. Guidance in this respect, and on limiting heat loss by air infiltration, can be found in:

England and Wales — Limiting thermal bridging and air leakage: Robust construction details for dwellings and similar buildings TSO 2002

Scotland — Accredited Construction Details (Scotland).

Northern Ireland — Accredited Construction Details (version 1.0).

5.6 Compliance with the guidance referred to in section 5.5 will allow the use of the default psi values from Table 3 of BRE Information Paper 1/06 *Assessing the effects of thermal bridging at junctions and around openings* and Table K1 of *The Government's Standard Assessment Procedure for Energy Rating of Dwellings* (SAP 2005), in Target Emission Rate calculations to SAP 2005 or the Simplified Building Energy Model (SBEM) ('simplified approach' for Scotland).

6 Condensation risk

Surface condensation

[E&W MAP] 6.1 Walls will limit the risk of surface condensation adequately when the thermal transmittance (U value) does not exceed 0.7 Wm⁻²K⁻¹ at any point, and the junctions with other elements are designed in accordance with the relevant requirements of TSO publication *Limiting thermal bridging and air leakage : Robust construction details for dwellings and similar buildings* TSO 2002 or BRE Information Paper IP 1/06.

[S MAP] 6.2 Walls will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed $1.2 \text{ Wm}^{-2}\text{K}^{-1}$ at any point. Guidance may be obtained from Section 8 of BS 5250 : 2002 and BRE report (BR 262 : 2002) *Thermal insulation: avoiding risks*.

Interstitial condensation

[ALL MAP] 6.3 Walls incorporating the boards will adequately limit the risk of interstitial condensation when they are designed and constructed in accordance with BS 5250 : 2002 (Section 8 and Annex D).

7 Behaviour in relation to fire

7.1 The following fire tests have been undertaken to BS 8414-1:2002.

- A 60mm thick Kooltherm K15 rainscreen insulation board of 1200mm x 900mm dimensions were mechanically fixed to a blockwork substrate. 1200mm x 900mm x 6mm thick cement particle boards, were mechanically fixed at 600mm centres to an aluminium railing system which was also mechanically fixed to the block work substrate. The cement particle boards provided the overcladding for the rainscreen system. A 40mm deep ventilated cavity was provided between the product and the cement particle board. Fire stopping was provided by a ventilated rainscreen barrier system, comprising of nominal 2.5mm thick graphite based intumescent strip bonded to nominal 0.6mm thick galvanised steel sheet, and positioned 0.5m and 4m above the fire chamber on both the main face and the wing face.

[ALL MAP] 7.2 The product is classified as Class 0 or 'low risk' as defined in the documents supporting the national Building Regulations. The system, therefore, may be used in accordance with the provisions of :

England and Wales – Approved Document B, paragraph 8.4, Volume 1 and paragraphs 12.5 and 12.6, Volume 2 (see also Diagram 40)

Scotland – Mandatory Standards 2.6 and 2.7, clauses 2.6.1⁽¹⁾⁽²⁾, 2.6.7⁽¹⁾⁽²⁾, 2.7.1⁽¹⁾⁽²⁾ and 2.7.2⁽²⁾ respectively and Annexes 2.C⁽¹⁾ and 2.E⁽²⁾.

(1) Technical Handbook (Domestic)

(2) Technical Handbook (Non-Domestic)

[All Map] 7.3 The product must not be carried over junctions between roofs and walls required to provide a minimum period of fire resistance. The continuity of fire resistance must be maintained, for example as described in:

England and Wales – Approved Document B, paragraph 5.11 and 5.12

Scotland – Mandatory Standard 2.2, clause 2.2.1⁽¹⁾⁽²⁾

Northern Ireland – Technical Booklet E, Paragraph 3.15

(1) Technical Handbook (Domestic)

(2) Technical Handbook (Non-Domestic)

7.4 In buildings with a floor more than 18 m above ground level, advice should be sought from the Certificate holder.

7.5 Cavities incorporating the product must incorporate cavity barriers at edges, around openings and at junctions with fire resisting elements in accordance with the relevant provisions of the national Building Regulations and relevant purpose group.

7.6 The design and installation of cavity barriers must take into account any anticipated differential movement, for example within framed structures.

7.7 Walls incorporating the product must meet the relevant requirements for fire resistance, and continuity of fire resistance at junctions with fire resisting elements, in accordance with the relevant provisions of the national Building Regulations.

8 Strength and stability

8.1 When installed in accordance with the requirements of this Certificate and the Certificate holder's instructions, the product should be designed to withstand, without damage or permanent deformation, the pressures imposed by wind forces likely to be experienced in the United Kingdom.

8.2 The wall and sub-frame to which the product is fixed should be structurally sound and constructed in accordance with sections 3.2 to 3.13. However, when designing the wall for strength, stability and racking, no contribution from the insulation should be assumed.

8.3 Wind loads should be calculated in accordance with BS EN 1991-1-4 : 2005 and BS 6399-2 : 1997. The higher-pressure coefficients applicable to corners of buildings should be used.

8.4 The product maybe capable of transmitting its self-weight and wind load to the structure. The adequacy of fixing to the structural frame or substrate for specific installations is outside the scope of this Certificate and must be verified by a suitably qualified engineer. Particular care is required around window and door openings to ensure that the structure is capable of sustaining additional weight due to reveal/frame details.

8.5 The cladding must be fixed to the frame or masonry substrate and designed in accordance with relevant standards and requirements.

9 Liquid water penetration

9.1 External walls must resist the ingress of rain when the construction is in accordance with BS 5628-3: 2005.

9.2 Care must be taken to ensure that the types of façades and wall finishes, and the design and detailing around openings are appropriate for the anticipated exposure conditions, and if appropriate, resist the movement of the frame.

10 Damp proofing

10.1 To resist the passage of moisture from the ground, adequate damp-proof courses and membranes must be provided in accordance with conventional practice and BS 8215 : 1991.

10.2 The boards must not be used in situations where they bridge the dpc in walls. Dampness from the ground will not pass through to the inner leaf provided the cavity wall is detailed in accordance with the requirements and provisions of the national Building Regulations:

England and Wales — Approved Document C2(a)

Scotland — Mandatory Standard 3.4, clause 3.4.5⁽¹⁾⁽²⁾

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — Technical Booklet C, Section 1.6.

11 Proximity of flues and appliances

When the boards are installed in close proximity to certain flue pipes and/or heat producing appliances, the following provisions to the national Building Regulations are acceptable:

England and Wales — Approved Document J

Scotland — Mandatory Standard 3.19, clauses 3.19.1⁽¹⁾⁽²⁾ to 3.19.4⁽¹⁾⁽²⁾ and 3.19.8⁽¹⁾⁽²⁾

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — Technical Booklet L

12 Maintenance

[S & NI MAP] As the boards are confined within the wall construction and it has suitable durability (see section 13), maintenance is not required.

13 Durability

[ALL MAP] When installed in accordance with the Certificate holder's instructions, the board will have a life equivalent to that of the structure in which it is incorporated.

Installation

14 General

14.1 The product can be cut using a fine-toothed saw or sharp knife but care must be taken to prevent damage particularly to edges.

14.2 Cavity barriers at the junction of the external wall and roof space should be provided. See section 7.5 of this Certificate.

14.3 It is important to ensure a tight fit between boards. Ensure accurate trimming to achieve close butting joints and continuity of insulation.

14.4 Gaps and joints in the insulation envelope may be covered with manufacturer's approved rainscreen cladding tape applied to the external joints of insulation board to provide a weathertight finish.

15 Procedure

Fitting boards

15.1 Boards are installed, fully restrained against the structural wall in a brick bond pattern with suitable insulation fasteners. Boards should be installed with a minimum 200 mm staggered bond using a minimum number of nine fasteners per board located between 50 – 150mm from the edges or corners of the board.

Cladding

15.2 Because rainscreen cladding systems are proprietary and utilize different mechanisms for attaching cladding panels to the wall structure, sitework guidance should be sought from system manufacturers.

16 Repair

Damaged boards can be replaced before the installation of weatherproofing cladding.

Technical Investigations

17 Investigations

An examination was made of test data relating to:

- dimensional stability under specified temperature and humidity
- cohesive strength
- water vapour permeance
- thermal conductivity
- flexural strength / bending behaviour
- water absorption
- water penetration
- density

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- dimensional accuracy and flatness
- reaction to fire
- condensation risk
- durability
- burning characteristics.

Bibliography

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

BS 5628-1 : 2005 *Code of practice for the use of masonry — Structural use of unreinforced masonry*

BS 5628-3 : 2005 *Code of practice for the use of masonry — Materials and components, design and workmanship*

BS 5950-5 : 1998 *Structural use of steelwork in building — Code of practice for design of cold formed thin gauge sections*

BS 6399-2 : 1997 *Loading for buildings — Code of practice for wind loads*

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

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

BS 8110-2 : 1985 *Structural use of concrete — Code of practice for special circumstances*

BS 8215 : 1991

BS 8414-1:2002

BS EN 1991-1-4 : 2005 *Eurocode 1 — Actions on structures — General actions — Wind actions*

BS EN ISO 6946 : 1997 *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*

Conditions of Certification

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.

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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.

APPENDIX 1 (TABLES)

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Table 1 Declared Thermal Conductivity values

Thickness (mm)	Thermal conductivity ($\text{Wm}^{-1}\text{K}^{-1}$)
<45	0.024
45 - 100	0.021

APPENDIX 2 (FIGURES AND PHOTOGRAPHS)

Fig. 1 : Typical installation

Masonry construction / timber frame construction / Steel frame construction

[CLIENT TO SUPPLY SUITABLE IMAGE]

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