

## Kingspan Insulation Limited

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Agrément Certificate  
**16/5299**  
Product Sheet 5

### KINGSPAN KOOLTHERM RANGE FOR FLOORS, WALLS AND PITCHED ROOFS

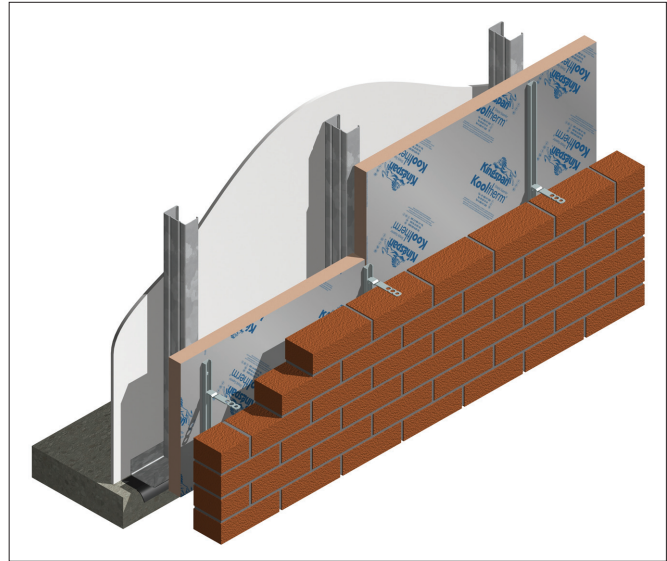
#### KOOLTHERM K1 12 FRAMING BOARD INSULATION

This Agrément Certificate Product Sheet<sup>(1)</sup> relates to Kooltherm K1 12 Framing Board Insulation, for use between studding and/or as insulated sheathing over walls of conventional timber-frame or steel-frame buildings up to 18 metres in height with an outer course of masonry.

(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  $0.018 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$  (see section 6).

**Condensation risk** — installation of the product must not be carried out until the moisture content of the timber frame is less than 20%. The product can contribute to minimising the risk of condensation (see section 8).

**Behaviour in relation to fire** — the product has a reaction to fire classification of Class F to BS EN 13501-1 : 2007 (see section 9).

**Durability** — the product is durable and sufficiently stable to remain effective as an insulation for the life of the building (see section 14).

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: 16 February 2017

John Albon — Head of Approvals  
Construction Products

Claire Curtis-Thomas  
Chief Executive

*The BBA is a UKAS accredited certification body — Number 113. The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at [www.bbacerts.co.uk](http://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, Kooltherm K112 Framing Board 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)

<b>Requirement:</b>	B3(1)(4)	<b>Internal fire spread (structure)</b>
<b>Comment:</b>		The product can contribute to satisfying this Requirement. See section 9.1 of this Certificate.
<b>Requirement:</b>	C2(c)	<b>Resistance to moisture</b>
<b>Comment:</b>		The product can contribute to satisfying this Requirement. See sections 8.1 and 8.3 of this Certificate.
<b>Requirement:</b>	L1(a)(i)	<b>Conservation of fuel and power</b>
<b>Comment:</b>		The product can contribute to satisfying this Requirement. See section 6 of this Certificate.
<b>Regulation:</b>	7	<b>Materials and workmanship</b>
<b>Comment:</b>		The product is acceptable. See section 14 and the <i>Installation</i> part of this Certificate.
<b>Regulation:</b>	26	<b>CO<sub>2</sub> emission rates for new buildings</b>
<b>Regulation:</b>	26A	<b>Fabric energy efficiency rates for new dwellings (applicable to England only)</b>
<b>Regulation:</b>	26A	<b>Primary energy consumption rates for new buildings (applicable to Wales only)</b>
<b>Regulation:</b>	26B	<b>Fabric performance values for new dwellings (applicable to Wales only)</b>
<b>Comment:</b>		The product can contribute to satisfying these Regulations; however, compensating fabric/services measures may be required. See section 6 of this Certificate.



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

<b>Regulation:</b>	8(1)	<b>Durability, workmanship and fitness of materials</b>
<b>Comment:</b>		The product is acceptable. See section 14 and the <i>Installation</i> part of this Certificate.
<b>Regulation:</b>	9	<b>Building standards applicable to construction</b>
<b>Standard:</b>	2.4	<b>Cavities</b>
<b>Comment:</b>		The product can contribute to satisfying this Standard, with reference to clause 2.4.2 <sup>(1)</sup> . See sections 9.1, 9.3 and 9.5 of this Certificate.
<b>Standard:</b>	2.6	<b>Spread to neighbouring buildings</b>
<b>Comment:</b>		The product can contribute to satisfying this Standard, with reference to clause 2.6.1 <sup>(1)</sup> . See section 9.3 of this Certificate.
<b>Standard:</b>	3.15	<b>Condensation</b>
<b>Comment:</b>		The product can contribute to satisfying this Standard, with reference to clauses 3.15.1 <sup>(1)</sup> , 3.15.3 <sup>(1)</sup> and 3.15.4 <sup>(1)</sup> . See sections 8.2 and 8.3 of this Certificate.
<b>Standard:</b>	6.1(b)	<b>Carbon dioxide emissions</b>
<b>Standard:</b>	6.2	<b>Building insulation envelope</b>
<b>Comment:</b>		The product can contribute to satisfying these Standards, with reference to clauses, or parts of, 6.1.2 <sup>(1)</sup> , 6.1.3 <sup>(2)</sup> , 6.1.6 <sup>(1)</sup> , 6.2.1 <sup>(1)</sup> , 6.2.3 <sup>(1)</sup> , 6.2.4 <sup>(2)</sup> , 6.2.6 <sup>(2)</sup> , 6.2.7 <sup>(2)</sup> and 6.2.9 <sup>(1)(2)</sup> to 6.2.12 <sup>(1)(2)</sup> . See section 6 of this Certificate.
<b>Standard:</b>	7.1(a)(b)	<b>Statement of sustainability</b>
<b>Comment:</b>		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>	12	<b>Building standards applicable to conversions</b>
<b>Comment:</b>		All comments given for 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>	23	<b>Fitness of material and workmanship</b>
<b>Comment:</b>		The product is acceptable. See section 14 and <i>Installation</i> part of this Certificate.
<b>Regulation:</b>	29	<b>Condensation</b>
<b>Comment:</b>		The product can contribute to satisfying this Regulation. See section 8.3 of this Certificate.
<b>Regulation:</b>	35(1)(4)	<b>Internal fire spread – structure</b>
<b>Comment:</b>		The product can contribute to satisfying this Regulation. See section 9.1 of this Certificate.
<b>Regulation:</b>	39(a)(i)	<b>Conservation measures</b>
<b>Regulation:</b>	40(2)	<b>Target carbon dioxide emission rate</b>
<b>Comment:</b>		The product can contribute to satisfying these Regulations. See section 6 of this Certificate.

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

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

## Additional Information

### NHBC Standards 2017

NHBC accepts the use of Kooltherm K112 Framing Board Insulation, provided it is installed, used and maintained in accordance with this Certificate, in relation to *NHBC Standards*, Chapter 6.2 *External timber framed walls* and Chapter 6.10 *Light steel framed walls and floors*.

## Technical Specification

### 1 Description

1.1 Kooltherm K112 Framing Board Insulation comprises phenolic foam board bonded on both sides to (perforated) aluminium foil/kraft/foil tri-laminate, for use between the studding and/or as sheathing over walls of normal timber-frame or steel-frame buildings with a ventilated and drained cavity between the outer leaf and the timber frame. The product is for use on buildings up to 18 metres in height.

1.2 The boards are available with the nominal characteristics shown in Table 1.

Table 1 Nominal characteristics of boards

	Nominal values
Length (mm) <sup>(1)</sup>	2400
Width (mm) <sup>(1)</sup>	1200
Thickness (mm) <sup>(1)</sup>	20 – 140 (in 5 mm increments)
Apparent density (kg·m <sup>-3</sup> )	35
Edge details	plain
Compressive strength (kPa)	>100

(1) Other board dimensions are available on request.

### 2 Manufacture

2.1 Raw materials are injected onto the lower foil-facer on a conveyor belt. The exothermic reaction expands the foam, which then comes into contact with the upper foil-facer. An automated process cures and cuts the product to the required size.

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.

2.3 The management system of Kingspan Insulation Limited has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 by the *Loss Prevention Certification Board (LPCB)* (Certificate 388).

### 3 Delivery and site handling

3.1 The product is delivered to site shrink-wrapped in polythene packs containing a label with the product description and characteristics, the manufacturer's name and the BBA logo incorporating the number of this Certificate.

3.2 The product must be protected from rain, snow and prolonged exposure to sunlight. Ideally, it should be stored inside. If, however, outside storage cannot be avoided, the boards should be stacked clear of the ground and covered with an opaque polythene sheet or weatherproof tarpaulin. Boards that have been allowed to get wet or that are damaged must not be used. Nothing should be stored on top of the boards.

3.3 The product must not be exposed to a naked 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 Kooltherm K112 Framing Board Insulation.

## Design Considerations

### 4 General

4.1 Kooltherm K112 Framing Board Insulation is effective in reducing the U value (thermal transmittance) of external walls of timber- or steel-frame dwellings up to 18 metres in height. It is essential that such walls are designed and constructed to incorporate the normal precautions against moisture ingress. This would include the application of a suitable breather membrane where appropriate.

4.2 Buildings subject to the national Building Regulations should be designed and 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 351-1 : 2007
- BS EN 845-1 : 2013
- BS 8000-3 : 2001
- BS EN 1995-1-1 : 2004
- BS EN 1993-1-2 : 2005.

4.3 New buildings not subject to these Regulations should also be built in accordance with the Standards listed in section 4.2.

4.4 Cavity wall ties with insulation-retaining fixings and, if required, any additional ties to BS EN 845-1 : 2013 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.

4.5 Services which penetrate the dry lining (eg light switches, power outlets) must be kept to a minimum to limit damage to vapour checks. In addition, to preserve the fire resistance of the wall, any penetrations should be enclosed in plasterboard, stone mineral wool or a suitably-tested proprietary fire-rated system.

4.6 This application requires a vapour control layer (VCL) behind the internal finish, which should be a minimum thickness of 0.125 mm (500 gauge) polyethylene, or plasterboard backed with a vapour control membrane.

4.7 Installation must not be carried out until the moisture content of the timber frame is less than 20%.

### 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 : 2007 and BRE Report BR 443 : 2006, using the thermal conductivity ( $\lambda_p$ ) of 0.018  $W \cdot m^{-1} \cdot K^{-1}$  and a foil surface emissivity ( $\epsilon$ ) of 0.05.

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

Table 2 Wall U values (combined area method<sup>(1)</sup>)

Target U value (W·m <sup>-2</sup> ·K <sup>-1</sup> ) (mm)	Insulation thickness			
	Between timber frame studs (140 mm) (System 1)	Between timber frame studs and over studs – sheathing <sup>(3)</sup> (140 mm) (System 2)	All over timber frame studs – sheathing <sup>(3)</sup> (140 mm) (System 3)	All over steel frame system <sup>(3)</sup> (140 mm) (System 4)
0.18	130 <sup>(2)</sup>	75 + 20	85	85
0.19	120 <sup>(2)</sup>	65 + 20	80	80
0.25	80	— <sup>(4)</sup>	55	55
0.26	75	— <sup>(4)</sup>	50	55
0.27	70	— <sup>(4)</sup>	50	50
0.28	65	— <sup>(4)</sup>	45	50
0.30	60	— <sup>(4)</sup>	40	45
0.35	45	— <sup>(4)</sup>	35	35

(1) For system construction details, see section 15 of this Certificate.

(2) 200 mm deep timber frame.

(3) Fixing for sheathing assumed to be 5.6 fully-penetrating steel ( $\lambda = 50 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ ) fixings per square metre (300 mm centres) with a cross-sectional area of 9.6 mm<sup>2</sup> (3.5 mm diameter) and wall ties 18 mm<sup>2</sup> and 3.7 m<sup>-2</sup> ( $\lambda = 50 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ ).

(4) Can be achieved with System 1.

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 Constructions incorporating the product, and built in accordance with the Standards listed in section 4.2, will resist the transfer of precipitation to the inner leaf and satisfy the national Building Regulations:

**England and Wales** — Approved Document C, Section 5, and Volume 2, Section 8

**Scotland** — Mandatory Standard 3.10, clauses 3.10.1<sup>(1)(2)</sup>, 3.10.3<sup>(1)(2)</sup> and 3.10.5<sup>(1)(2)</sup>

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

**Northern Ireland** — Technical Booklet C, section 6.

7.2 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 slabs
- 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's at ground level do not project into the cavity as they can form a trap for mortar bridging
- raked or recessed mortar joints are avoided in very severe exposure areas.

## 8 Condensation risk

### Surface condensation



8.1 Walls will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed 0.7 W·m<sup>-2</sup>·K<sup>-1</sup> 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.



8.2 Walls will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed 1.2 W·m<sup>-2</sup>·K<sup>-1</sup> 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.

### 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.

8.4 For the purposes of assessing the risk of interstitial condensation, the insulation core has a vapour resistance value of 18.5 MN·s·g<sup>-1</sup>·m<sup>-1</sup>, with a resistance value of 3 MN·s·g<sup>-1</sup> for each foil-facing.

8.5 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 in the internal wall leaf.

## 9 Behaviour in relation to fire



9.1 The product has a reaction to fire classification of Class F to BS EN 13501-1 : 2007.

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. Cavity barriers are required around openings, penetrations and junctions with roof or floor cavities, with reference to clauses 2.4.1<sup>(1)(2)</sup>, 2.4.2<sup>(1)(2)</sup>, 2.6.5<sup>(1)</sup> and 2.6.6<sup>(2)</sup>.

(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<sup>(1)(2)</sup>, 2.4.2<sup>(1)(2)</sup>, 2.4.7<sup>(1)</sup> and 2.4.9<sup>(2)</sup>

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

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



9.5 A fire test was undertaken on a 112 mm thick wall-sized assembly to BS 476-21 : 1987, comprising 100 mm by 50 mm softwood studs at nominal 600 mm centres with an outer face of 9 mm thick oriented strand board (OSB) nailed to the studs. Nominal 75 mm thick panels were fitted between studs and held in place by 25 mm square battens nailed to the studs. The exposed surface had nominal 12.5 mm thick, Type 1 plasterboard nailed to the studs. A single timber stud of the same dimension as the vertical studs was fixed across the head and base of the assembly. A loadbearing capacity, integrity and insulation of 50 minutes was achieved.

9.6 An assembly with an overall thickness of 176 mm was tested to BS EN 1365-1 : 2012, and the load bearing capacity, integrity and insulation achieved 49 minutes, hence achieving a fire resistance of REI 45. The build-up of the test specimen was as follows:

- Six softwood timber studs (38 mm by 38 mm) at 600 mm centres, clad on the unexposed face with a single layer of 9 mm thick OSB.
- An inner layer of 25 mm thick K112 fixed to the OSB, with 70 mm thick K112 fitted between the timber studs.
- The exposed surface of the assembly was clad with a single layer of 15 mm thick plasterboard, screwed to the timber battens.

9.7 When installing the product as an insulation sheathing to either timber- or steel-framed buildings, the rigid insulation sheathing can provide a suitable substrate for attachment of the cavity barrier. For guidance on installation, the cavity barrier manufacturer or Certificate holder may be contacted.

9.8 Cavity walls should always have a cavity closer at the top of the cavity and around openings. The material must not be taken past fire stops. If fire does penetrate into an unventilated cavity, the amount of air present will be insufficient to support combustion and flame spread will be minimal.

## 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, sections 1 to 4

**Scotland** — Mandatory Standard 3.19, clauses 3.19.1<sup>(1)(2)</sup> to 3.19.9<sup>(1)(2)</sup>

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

**Northern Ireland** — Technical Booklet L, section 2.

## 11 De-rating of electrical cables

As with other insulation products, it may be necessary in some cases to de-rate electrical cables buried in insulation. BS 7671 : 2008 recommends that where wiring is completely surrounded by insulation it may need to be de-rated to as low as half its free air-current-carrying capacity. Guidance should be sought from a qualified electrician.

## 12 Infestation

Use of the product does not in itself promote infestation. The creation of voids within the structure (for example, gaps between the wall lining and the boards) may provide habitation for insects or vermin in areas already infested. Care should be taken to ensure, wherever possible, that all voids are sealed, as any infestation may be difficult to eradicate. There is no food value in the materials used.

## 13 Maintenance

As the product is confined within the wall cavity and has suitable durability (see section 14 of this Certificate), maintenance is not required.

## 14 Durability



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

## Installation

### 15 General

15.1 Installation of the product must be in accordance with the relevant clauses of BE EN 1995-1-1 : 2004 and BS EN 1993-1-2 : 2005 and the Certificate holder's instructions.

15.2 The boards are light to handle and can be cut easily but care must be taken to prevent damage, particularly at edges.

15.3 Damaged boards should not be used; small areas of damaged faces may be repaired with self-adhesive aluminium foil tape.

15.4 Where a plasterboard lining is used, it should be of the vapour check type, or a separate polythene VCL can be used. A VCL may not be required in all applications and reference should be made to BS 5250 : 2011.

15.5 The insulation may be installed between or over the studs of steel-frame constructions. Guidance should be sought from the Certificate holder.

15.6 Boards should be tight fitting against the structure. Gaps should be filled with an expanding urethane sealant.

#### Between studs

15.7 Boards should be fitted so that their edges are flush with the outer faces of the studs and bottom and top plates and restrained by nailed battens. Alternative restraints may be affected by metal fixing clips.

#### Timber-frame sheathing (over stud installation)

15.8 The boards should be fixed to the external surface of the timber-frame structure (outside any OSB or plywood sheathing) and restrained using temporary fixings in the form of large-headed galvanized clout nails, prior to being tied into the brickwork with an appropriate timber-frame wall tie. The boards must be tightly butted and any requirements of the timber-frame manufacturer met.

15.9 The outer leaf of brickwork should be constructed in the conventional manner using appropriate wall ties to restrain the two wall skins together. The ties should be inserted whilst constructing the outer leaf ensuring a slight offset is achieved, sloping the tie downwards towards the outer leaf.

#### Steel frame

15.10 Similarly fixed as for timber-frame constructions, the boards should be restrained to the outside of the steel-frame construction ensuring vertical board joints coincide with a vertical member. Fixings should be in accordance with the steel-frame manufacturer's recommendations.

15.11 Advice should be sought from the steel-frame manufacturer for suitable wall tie specifications.

## Technical Investigations

### 16 Tests

The following is a summary of the technical investigations carried out on Kooltherm K112 Framing Board Insulation by the BBA:

- emissivity
- calculation of U values.

### 17 Investigations

17.1 An examination was made of data relating to:

- dimensional accuracy
- bending strength
- dimensional stability with temperature

- thermal conductivity (fresh and aged)
- fire resistance
- water vapour resistance
- effect of wall ties.

17.2 An assessment of the thermal and hygrothermal properties of the two types of application of the product was made, including condensation risk calculations.

17.3 Assessments were made of the product's structural adequacy, durability and behaviour in fire.

17.4 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

- BS 476-21 : 1987 *Fire testes on building materials and structures — Methods for determination of the resistance of loadbearing elements of construction*
- BS 5250 : 2011 *Code of practice for control of condensation in buildings*
- BS 7671 : 2008 *Requirements for Electrical Installations — IET Wiring Regulations*
- BS 8000-3 : 2001 *Workmanship on building sites — Code of practice for masonry*
- BS EN 351-1 : 2007 *Durability of wood and wood-based products — Preservative-treated solid wood — Classification of preservative penetration and retention*
- BS EN 845-1 : 2013 *Specification for ancillary components for masonry — Ties, tension straps, hangers and brackets*
- BS EN 1993-1-2 : 2005 *Design of steel structures — General rules — Structural fire design*
- BE EN 1995-1-1 : 2004 *Eurocode 5: Design of timber structures — General — Common rules and rules for buildings*
- 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 13166 : 2012 *Thermal insulation products for buildings — Factory made phenolic foam (PF) products — Specification*
- BS EN 13501-1 : 2007 *Fire classification of construction products and building elements — Classification using test data from reaction to fire tests*
- BS EN ISO 6946 : 2007 *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*
- BS EN ISO 9001 : 2008 *Quality management systems — Requirements*
- BRE Report (BR 262 : 2002) *Thermal insulation: avoiding risks*
- BRE Report (BR 443 : 2006) *Conventions for U-value calculations*



## 18 Conditions

18.1 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.

18.2 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.

18.3 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.

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

18.5 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.

18.6 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.