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BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION

Agrément Certificate
11/4819
Product Sheet 2

LOW-E FOIL INSULATION FOR PITCHED ROOFS, DRY LININGS AND FLOORS

LOW-E FOIL INSULATION FOR USE IN DRY LINING APPLICATIONS

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to Low-E Foil Insulation for use in Dry Lining Applications, in conjunction with appropriate internal lining board, as an insulating dry lining for block masonry walls, timber frame walls or ceilings in new and existing dwellings.

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 — when combined with other types of insulation, the product can contribute to meeting the U value requirement of a wall or ceiling (see section 5).

Condensation risk — the product will contribute to minimising the risk of interstitial and surface condensation. It has a water vapour resistance of 2000 MN·s·g^{-1} and may be used as a vapour control layer (see section 6).

Behaviour in relation to fire — the product has a fire Class 1 rating in accordance with BS 476-7 : 1997 (see section 8).

Air leakage — the product may be used as a vapour control layer and air barrier (see section 9).

Durability — the durability of the product is satisfactory and will have a life equivalent to the structure in which it is incorporated (see section 13).

The BBA has awarded this Agrément Certificate to the company named above for the product described herein. The 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:

Simon Wroe
Head of Approvals — Physics

Greg Cooper
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

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, Low-E Foil Insulation for use in Dry Lining Applications, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements of the following Building Regulations:

The Building Regulations 2010 (England and Wales)

Requirement:	C2(c)	Resistance to moisture
Comment:		The product will contribute to minimising the risk of surface and interstitial condensation. See sections 6.1 and 6.5 of this Certificate.
Requirement:	L1(a)(i)	Conservation of fuel and power
Comment:		The product can contribute to meeting this Requirement. See section 5.3 of this Certificate.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The product is an acceptable material. See section 13 and the *Installation* part of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)	Fitness and durability of materials and workmanship
Comment:		The use of the product satisfies the requirements of this Regulation. See section 13 and the *Installation* part of this Certificate.
Regulation:	9	Building Standards — construction
Standard:	3.15	Condensation
Comment:		The product can contribute to satisfying this standard with reference to clauses 3.15.1[1], 3.15.4[1] and 3.15.5[1]. See sections 6.1 and 6.6 of this Certificate.
Standard:	6.1(b)	Carbon dioxide emissions
Standard:	6.2	Building insulation envelope
Comment:		The product can contribute to satisfying clauses, or parts of 6.1.1[1], 6.1.3[1], 6.1.6[1], 6.2.1[1], 6.2.4[1], 6.2.5[1], 6.2.9[1], 6.2.11[1], 6.2.12[1] and 6.2.13[1] of these standards. See section 5.3 of this Certificate.
Regulation:	12	Building standards — conversions
Comment:		All comments given for the product under Regulation 9, also apply to this Regulation, with reference to clause 0.12.1[1] and Schedule 6[1].

(1) Technical Handbook (Domestic).

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

Regulation:	B2	Fitness of materials and workmanship
		The product is acceptable. See section 13 and the *Installation* part of this Certificate.
Regulation:	C5	Condensation
Comment:		A wall incorporating the product can satisfy this Regulation. See section 6.1 of this Certificate.
Regulation:	F2(a)(i)	Conservation measures
Regulation:	F3(2)	Target carbon dioxide Emissions Rate
Comment:		The product can contribute to meeting these Regulations. See section 5.3 of this Certificate.

Construction (Design and Management) Regulations 2007

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

In the opinion of the BBA, there is no information in this Certificate which relates to the obligations of the client, CDM co-ordinator, designer or contractors under these Regulations.

Non-regulatory Information

NHBC Standards 2011

NHBC accepts the use of Low-E Foil Insulation for use in Dry Lining Applications, when installed and used in accordance with this Certificate, in relation to *NHBC Standards*, Chapter 6.1 *External masonry walls* and Chapter 6.2, *External timber framed walls*.

Technical Specification

1 Description

1.1 Low-E Foil Insulation for use in Dry Lining Applications consists of a polyethylene foam core manufactured with a coated aluminium foil lining on both sides and with self-adhesive tape which is factory bonded to the edge of the product.

1.2 The product can contribute to improving the thermal performance when installed as detailed within the application instructions.

1.3 The nominal characteristics of the product are given in Table 1.

Table 1 Product characteristics

Length (m)	Width (m)	Thickness (mm)	Area covered (m^2)	Mass per unit area $g \cdot m^{-2}$
16.6	1.2	5	20	150
33.3	1.2	5	40	150
38.0	1.2	5	46	150

1.4 The product is manufactured by Environmentally Safe Products, USA. All components are subject to routine factory quality control.

1.5 The product may be stapled into position in accordance with the Certificate holders installation procedures.

1.6 Ancillary items for use with this product but outside the scope of this Certificate are:

- self-adhesive tape
- timber battens
- plasterboard
- screws
- staples
- additional insulation.

2 Delivery and site handling

2.1 The product is delivered to site in rolls and each incorporates a label bearing the manufacturer's name, product description, characteristics and the BBA identification mark incorporating the number of this Certificate.

2.2 The product must be protected from prolonged exposure to sunlight and must be stored either under cover or protected with opaque polythene. Where possible, packs should be stored inside. If stored outside, the product should be raised above ground level, not in contact with ground moisture.

2.3 The product must not be exposed to open flame or other ignition sources.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Low-E Foil Insulation for use in Dry Lining Applications.

Design Considerations

3 General

3.1 Low-E Foil Insulation for use in Dry Lining Applications, is suitable for use as a flexible insulation material in conjunction with appropriate internal lining board, as an insulating dry lining for block masonry walls, timber frame walls or ceilings in new and existing dwellings.

3.2 The wall or sub-frame should be structurally sound and should have been designed and constructed in accordance with the following standards:

BS EN 1995-1-1 : 2004, BS 5589 : 1989 and BS EN 351-1 : 1996 for timber.

BS EN 1996-1-1 : 2005, BS EN 1996-1-2 : 2005, BS 8110-1 : 1997, BS 8110-2 : 1985, BS EN 1996-2 : 2006 for masonry.

3.3 The installation requires careful detailing around doors and windows to achieve a satisfactory surface for finishing. In addition, every attempt should be made to minimise the risk of thermal bridging at reveals and where heavy separating walls are attached to the external wall. In new work, the construction must be designed to accommodate the thickness of the dry lining, particularly at reveals, heads, sills and in relation to ceiling height.

3.4 Services can be incorporated behind the dry lining, making chasing of the wall unnecessary. Where possible, penetration of the product by services should be kept to a minimum to limit possible penetration by water vapour.

3.5 The surfaces of masonry walls should be sound and free from loose material; large projections should be removed and holes filled and levelled. A survey of the wall may be needed to establish the extent of any packing that may be required to ensure the support battens provide a uniform plane for the boards to be fixed.

3.6 Installation of plasterboard must be in accordance with the relevant sections of to BS EN 520 : 2004.

4 Practicability of installation

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

5 Thermal performance

5.1 Calculations of thermal transmittance (U value) should be carried out in accordance with BS EN ISO 6946 : 2007 and BRE Report (BR 443 : 2006), *Conventions for U-value calculations* using the following values:

- 0.15 $m^2 \cdot K \cdot W^{-1}$ thermal resistance of insulation (nominal thickness 5 mm) with no air spaces either side
- 0.06 emissivity of outer layers
- 0.64 $m^2 \cdot K \cdot W^{-1}$ air cavity(1) resistance of minimum thickness 13 mm
- 0.00 $m^2 \cdot K \cdot W^{-1}$ *R*(2) value of product when compressed between battens and studs
- 50%/50% percentage of Low-E thickness in stud and plasterboard-batten cavities, respectively, for walls applications
- 0%/100% percentage of Low-E thickness in stud/joist and plasterboard-batten cavities, respectively, when rafter or stud depth is fully filled with insulation.

(1) Unventilated cavity with a width and length at least 10 times the thickness and one high emissivity surface.

(2) For guidance on U value calculations refer to the BBA Information Bulletin No 3 *Reflective foil insulation — Conventions for U value calculations*.

5.2 The U value of a wall will depend on the thickness of additional insulation used, the extent and arrangement of timber bridging and the insulating value of other wall components/layers. Example wall consuctions are shown in Figure 1 and example U values of walls incorporating the product are shown in Table 2.

Figure 1 Example wall constructions

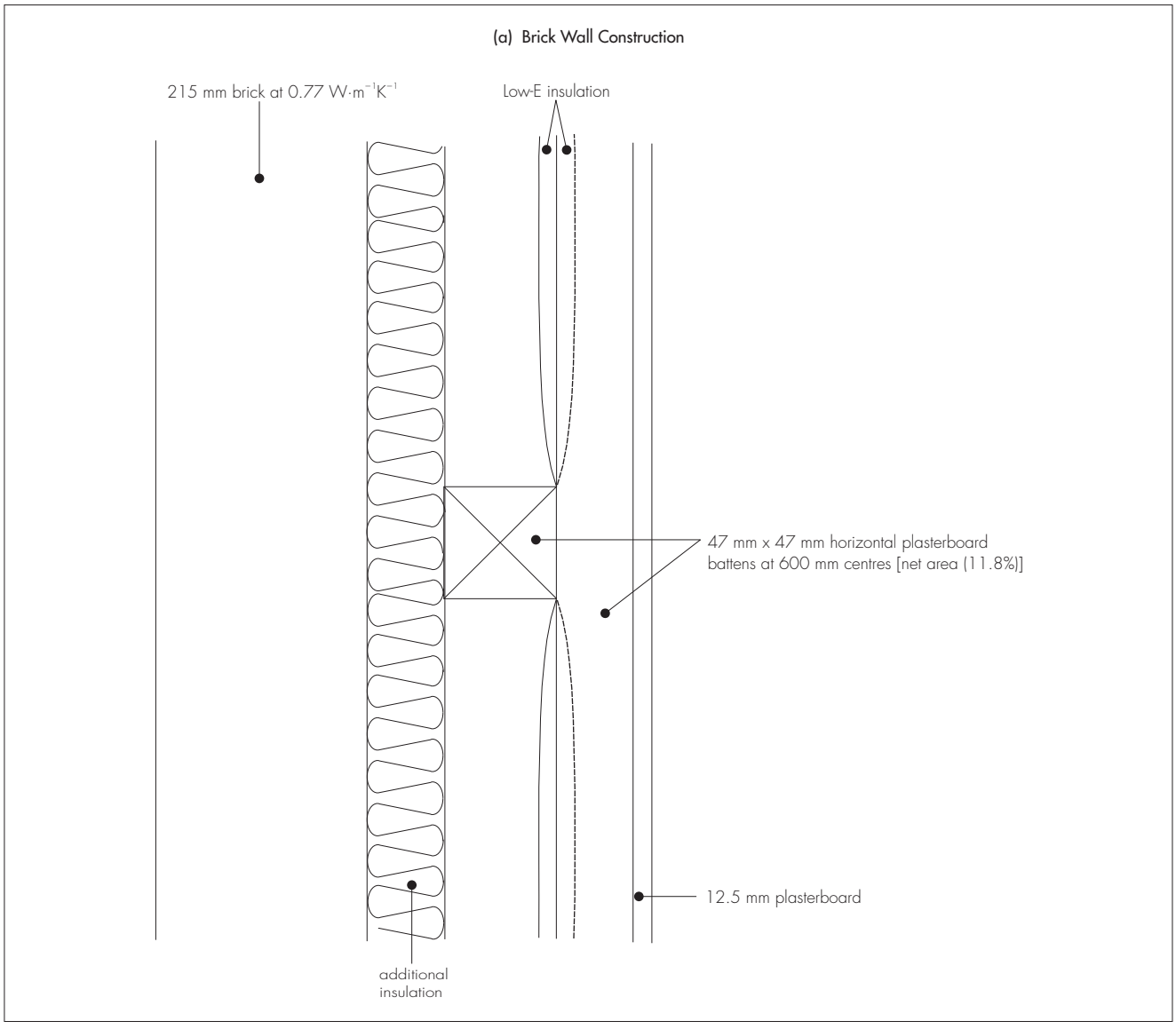

Figure 1 Example wall constructions (continued)

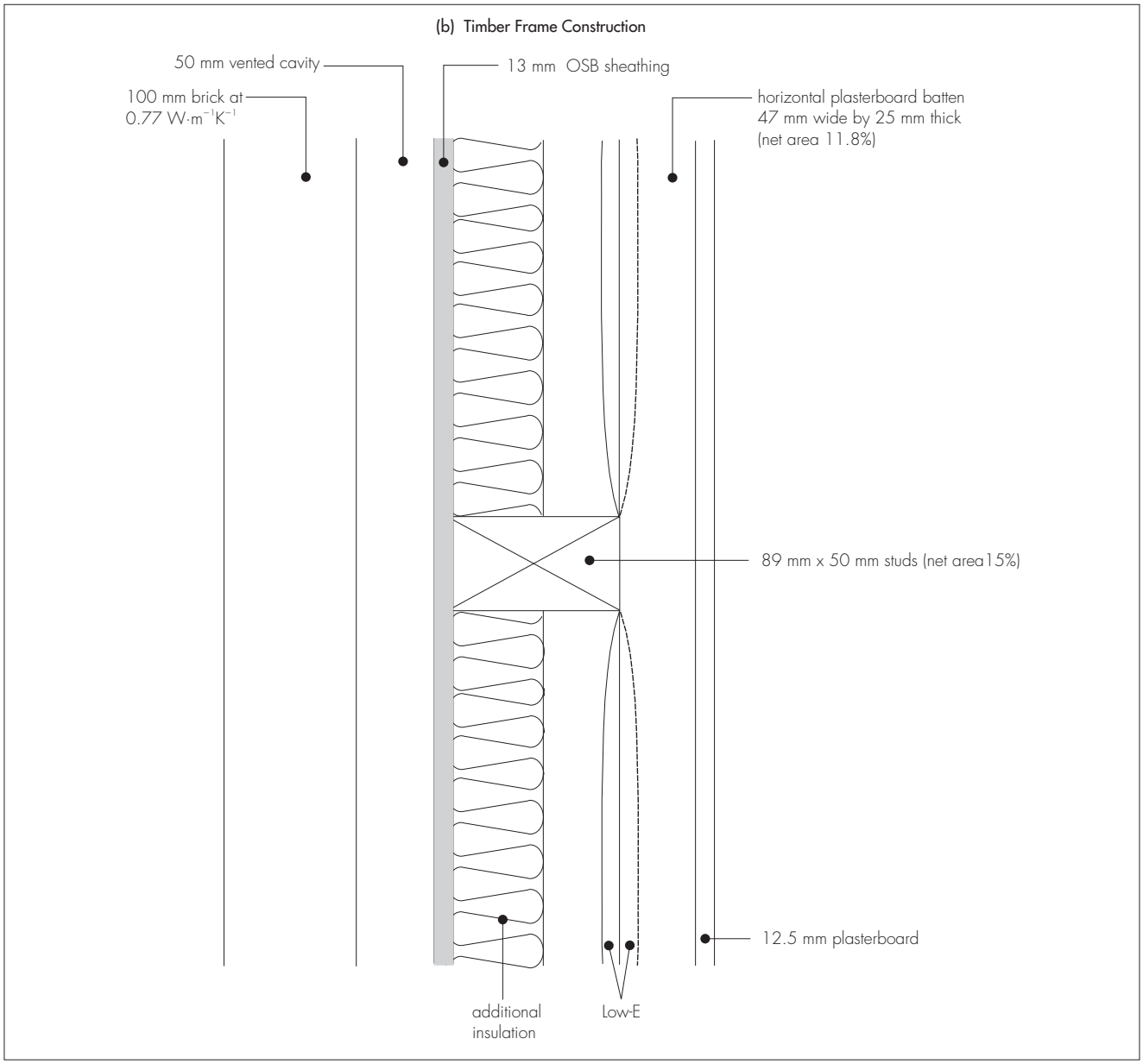

Table 2 Example U values for timber frame and solid masonry wall constructions

Construction	Additional insulation	U value ($W \cdot m^{-2} \cdot K^{-1}$)
Timber frame with 89 mm timber stud	55 mm Phenolic[1]	0.28
Timber frame with 140 mm timber stud	110 mm Phenolic[1]	0.19
Solid masonry	40 mm Phenolic[2]	0.28
	75 mm Phenolic[2]	0.19

(1) Masonry outer leaf, 50 mm cavity, sheathing board (OSB 13 mm), 89/140 mm studs infilled with Phenolic (λ = 0.020 $W \cdot m^{-1} \cdot K^{-1}$ for thickness ≥ 45 mm and 0.021 $W \cdot m^{-1} \cdot K^{-1}$ for thicknesses < 45 mm and ≥ 25 mm, foil faced, emissivity = 0.2), plasterboard (λ = 0.021 $W \cdot m^{-1} \cdot K^{-1}$) fixed to battens (25 mm deep).

(2) Solid masonrly wall 205 mm thick (bridged with mortar), studs and fixings correction (through the additional insulation) as per BR 443 and plasterboard (λ = 0.021 $W \cdot m^{-1} \cdot K^{-1}$) fixed to battens (25 mm deep).

5.3 The product can contribute to maintaining continuity of thermal insulation at junctions between elements. For Accredited Construction Details the corresponding psi values in BRE Information Paper IP1/06 *Assessing the effects of thermal bridging at junctions and around openings*, Table 3 may be used in carbon emission calculations in Scotland and Northern Ireland. Detailed guidance for other junctions and on limiting heat loss by air infiltration can be found in:

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

Scotland — Accredited Construction Details (Scotland)

Northern Ireland — Accredited Construction Details (version 1.0).

6 Condensation risk

Interstitial condensation

6.1 Walls and ceilings incorporating the product will adequately limit the risk on interstitial condensation when they are designed and constructed in accordance with BS 5250 : 2002, Section 8 and Annex D.

6.2 The product has a high water vapour resistance in excess of 2000 $MN \cdot s \cdot g^{-1}$. The use of the product does not preclude the normal precautions against formation of condensation, especially in rooms expected to have high humidity.

6.3 When using this type of product, due consideration must be taken of the overall installation to minimise perforations by services, eg light switches and power outlets and the joints at ceiling and skirting level must be well sealed.

6.4 As with any other insulation applied to the inside of a wall, there may be risk of thermal bridging from the floor or ceiling, particularly in concrete slabs construction. It has been demonstrated that the use of coving at the wall ceiling point will significantly reduce the problem.

Surface condensation

6.5 Walls and ceilings will limit the risk of surface condensation adequately when the thermal transmittance (U value) does not exceed 0.7 $W \cdot m^{-2} \cdot K^{-1}$ at any point, and the junctions with other elements are designed in accordance with the relevant requirements of *Limiting thermal bridging and air leakage : Robust construction details for dwellings and similar buildings* TSO 2002 or BRE Information Paper IP 1/06.

6.6 Walls and ceilings will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed 1.2 $W \cdot m^{-2} \cdot K^{-1}$ at any point. Guidance may be obtained from Section 8 of BS 5250 : 2002 and BRE Report (BR 262 : 2002) *Thermal insulation: avoiding risks*.

7 Infestation

The use of insulated dry lining does not in itself promote infestation. The creation of voids may provide habitation for insects or rodents in areas already infested. Care should be taken to ensure that, wherever possible, all voids are sealed as any infestation may be difficult to eradicate. There is no food value in the materials used.

8 Behaviour in relation to fire

8.1 The product has a fire rating of Class 1 surface spread of flame in accordance with BS 476-7 : 1997.

8.2 When installed with an internal lining board, eg 12.5 mm thick plasterboard, the product will be contained between the wall/ceiling and the internal lining board, until one is destroyed. Therefore, the insulation will not contribute to the development stages of a fire.

8.3 The insulation 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, Volume 1, Sections 5.11 to 5.12

Scotland — Mandatory Standard 2.2, clause 2.2.10(1)

(1) Technical Handbook (Domestic).

Northern Ireland — Technical Booklet E, paragraph 3.21.

8.4 When installed with other additional insulation materials, the fire properties of these materials must be taken into consideration.

8.5 The product will melt and shrink away from heat, but will burn in the presence of a naked flame.

9 Air leakage

9.1 The product was tested to BS EN 12114 : 2000 with positive pressure of approximately 600 Pa. The net leakage rate was 0 $m^3 \cdot hr^{-1} \cdot m^{-2}$.

9.2 When the product is used as a vapour control layer and an air barrier, the airtightness of the system is reliant on the careful sealing of the product and is dependent on maintaining the integrity of seal throughout. In addition to sealing at all joints, the insulation must be suitably sealed at the perimeter and all penetrations. Details of sealing at penetrations must be in accordance with the Certificate holder's instructions.

10 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 suggests 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.

11 Proximity of flues and appliances

When the product is installed in close proximity to certain flue pipes and/or heat-producing appliances, for buildings subject to national Building Regulations the relevant provisions and guidance given below should be met:

England and Wales — Approved Document J, Paragraph 2.15

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

(1) Technical Handbook (Domestic).

Northern Ireland — Technical Booklet L, Paragraph 2.9.

12 Maintenance

As the product is confined behind the wall lining or ceiling lining and has suitable durability (see section 13), maintenance is not required. Small holes, rips or punctures in the outer layers during installation must be repaired with adhesive tape.

13 Durability

The product will have a life equivalent to that of the wall or ceiling structure in which it is incorporated.

Installation

14 General

14.1 Installation of Low-E Foil Insulation for use in Dry Lining Applications and any additional insulation products should be in accordance with the Certificate holder's instructions and current good building practice.

14.2 Care must be taken to ensure the product is not damaged during installation. Should damage occur by tearing, the product may be repaired. The product is attached to wall studs using staples or nails. The product must have overlap joints of at least 50 mm and sealed using the self-adhesive jointing strip incorporated into the product.

14.3 When the product is cut to fit around openings, care should be taken to minimise and seal any gaps. The product can be cut using sharp scissors or a knife.

14.4 All joints and perforations in the products must be securely sealed.

14.5 The plasterboard is fixed over the product and onto the battens.

15 Procedure

Timber frame

15.1 Installation may be either vertical or horizontal runs. If horizontal, installation should start at the floor and go up to the ceiling.

15.2 The product is unrolled across the inside of the timber studs and fixed using staples.

15.3 The next layer must overlap the first layer by at least 50 mm. If securely taped, the product can also function as a vapour control layer and air barrier.

15.4 The product may be fixed to the timber studs using timber battens.

15.5 When the top layer has been battened, any excess material may be removed by running a sharp knife along the edge of the batten.

15.6 Plasterboard is fixed to the battens in the conventional manner.

Solid masonry

15.7 Timber battens are screwed to the wall at no greater than 600 mm vertical centres, at wall perimeters and horizontally as required.

15.8 The product may be stapled to the battens and counter battened before fixing the internal lining.

16 Tests

16.1 Results of tests carried out on Low-E Foil Insulation for use in Dry Lining Applications were assessed to determine:

- core thermal resistance
- emissivity
- air infiltration
- indicative characteristics
- tensile strength and elongation
- tear and puncture resistance
- resistance to water vapour transmission.

16.2 The product was also tested after ageing at 28 days at 70°C and 100% humidity for emissivity, which resulted in an emissivity value of 0.06.

17 Investigations

17.1 An assessment was made of data relating to the thermal insulation properties of the material and behaviour in fire.

17.2 A site visit was carried out to assess the practicability of installation.

17.3 The product has been tested within the following specific construction and resulted in a thermal transmittance, U value, of 0.62 $W \cdot m^{-2} \cdot K^{-1}$ thermal resistance with an unventilated air cavity adjacent to the product. The product consisted of Low-E reflective foil insulation battened over 38 mm studs at 400 mm centres. Two unventilated cavities were created, one between the insulation and a sheet of foil backed plasterboard and the other between the insulation and a sheet of thin plywood substituted for the cold side of the wall. The overall thickness of the test element was 261 mm. Heat flow direction horizontal.

17.4 An assessment of the risk of interstitial condensation in typical constructions was made.

Bibliography

BS 476-7 : 1997 *Fire tests on building materials and structures — Method of test to determine the classification of the surface spread of flame of products*

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

BS 5589 : 1989 *Code of practice for preservation of timber*

BS 7671 : 2008 *Requirements for electrical installations. IEE Wiring Regulations. Seventeenth Edition*

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 EN 351-1 : 1996 *Durability of wood and wood-based products — Preservative-treated solid wood — Classification of preservative penetration and retention*

BS EN 520 : 2004 *Gypsum plasterboards — Definitions, requirements and test methods*

BS 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*
BS EN 1996-1-2 : 2005 *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*

BS EN 12114 : 2000 *Thermal performance of buildings — Air permeability of building components and building elements — Laboratory test method*

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

18 Conditions

18.1 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.

18.2 Publications and documents referred to in this Certificate are those that the BBA deems to be relevant at the date of issue or re-issue of this Certificate and include any: Act of Parliament; Statutory Instrument; Directive; Regulation; British, European or International Standard; Code of Practice; manufacturers' instructions; or any other publication or document similar or related to the aforementioned.

18.3 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.

18.4 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.

18.5 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.

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