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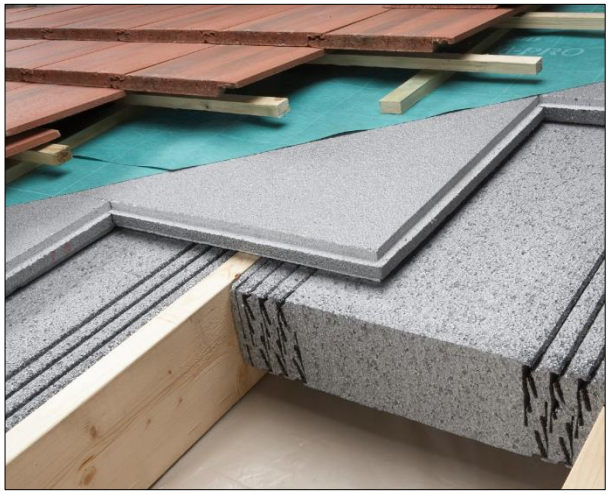
Agrément Certificate
08/4529
Product Sheet 3

SPRINGVALE EPS INSULATION BOARDS

SPRINGVALE WARMSQUEEZ/WARMSARK AND SPRINGVALE PLATINUM WARMSQUEEZ/WARMSARK

This Agrément Certificate Product Sheet(1) relates to Springvale Warmsqueez(2)/Warmsark(2) and Springvale Platinum Warmsqueez/Warmsark, expanded polystyrene (EPS) boards for use as insulation between and under/over rafters in tiled or slated pitched roofs, in existing dwellings and buildings of similar occupancy.

(1) Hereinafter referred to as 'Certificate'.
(2) Comprising white EPS.



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 products can contribute to the U value requirement for a roof. The thermal conductivities (λ_D) for the white and Platinum Warmsqueez are 0.037 and 0.030 $W \cdot m^{-1} \cdot K^{-1}$ respectively, and for the white and Platinum Warmsark 0.035 and 0.030 $W \cdot m^{-1} \cdot K^{-1}$ respectively (see section 6).
Condensation risk — the products can contribute to minimising the risk of interstitial and surface condensation (see section 7).
Durability — the products are durable, rot proof and sufficiently stable to remain effective as insulation for the life of the building (see section 11).

The BBA has awarded this Certificate to the company named above for the products described herein. These products have been assessed by the BBA as being fit for their intended use provided they are installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

John Albon – Head of Approvals Construction Products

Claire Curtis-Thomas
Chief Executive

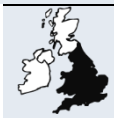
Date of Third issue: 31 July 2017

Originally certificated on 18 May 2011

Certificate amended on 17 August 2017 to include minor updates.

Regulations

In the opinion of the BBA, Springvale Warmsqueez/Warmsark and Springvale Platinum Warmsqueez/Warmsark, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):



The Building Regulations 2010 (England and Wales) (as amended)

Requirement:	**C2(c)**	**Resistance to moisture**
Comment:		The products can contribute to a roof satisfying this Requirement. See sections 7.1 and 7.5 of this Certificate.
Requirement:	**L1(a)(i)**	**Conservation of fuel and power**
Comment:		The products can contribute to a roof satisfying this Requirement. See section 6 of this Certificate.
Regulation:	**7**	**Materials and workmanship**
Comment:		The products are acceptable. See section 11 and the *Installation* part of this Certificate.
Regulation:	**26**	**CO_2 emission rates for new buildings**
Regulation:	**26A**	**Fabric energy efficiency rates for new dwellings (applicable to England only)**
Regulation:	**26A**	**Primary energy consumption rates for new buildings (applicable to England only)**
Regulation:	**26B**	**Fabric performance values for new dwellings (applicable to Wales only)**
Comment:		The products can contribute to satisfying these Regulations. See section 6 of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation:	**8(1)**	**Durability, workmanship and fitness of materials**
Comment:		The products can contribute to a construction satisfying this Regulation. See section 11 and the *Installation* part of this Certificate.
Regulation:	**9**	**Building standards applicable to construction**
Standard:	3.15	Condensation
Comment:		The products can contribute to satisfying the requirements of this Standard, with reference to clauses 3.15.1(1), 3.15.3(1), 3.15.5(1) and 3.15.7(1). See sections 7.1 and 7.6 of this Certificate.
Standard:	6.1(b)	Carbon dioxide emissions
Standard:	6.2	Building insulation envelope
Comment:		The products can contribute to satisfying these Standards, with reference to clauses, or parts of, 6.1.1(1), 6.1.3(1), 6.1.6(1), 6.2.1(1), 6.2.3(1), 6.2.4(1), 6.2.6(1), 6.2.7(1), 6.2.9(1) to 6.2.11(1) and 6.2.13(1). See section 6 of this Certificate.
Standard:	7.1(a)(b)	Statement of sustainability
Comment:		The products 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 products can contribute to a construction meeting a higher level of sustainability as defined in this Standard, with reference to clauses 7.1.4(1) [Aspects 1(1) and 2(1)], 7.1.6(1) [Aspects 1(1) and 2(1)] and 7.1.7(1) [Aspect 1(1)]. See section 6.1 of this Certificate.

Regulation:	**12**	**Building standards applicable to conversions**
Comment:		Comments in relation to the products under Regulation 9, Standards 1 to 6, 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) 2012 (as amended)

Regulation:	**23**	**Fitness of materials and workmanship**
Comment:		The products are acceptable. See section 11 and the *Installation* part of this Certificate.
Regulation:	**29**	**Condensation**
Comment:		The products can contribute to a roof satisfying this Regulation. See section 7.1 of this Certificate.
Regulation:	**39(a)(i)**	**Conservation measures**
Regulation:	**40(2)**	**Target carbon dioxide emission rate**
Comment:		The products can contribute to satisfying these Regulations. See section 6 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 sections: 3 *Delivery and site handling* (3.3) and 12 *General* (12.3) of this Certificate.

Additional Information

NHBC Standards 2017

In the opinion of the BBA, Springvale Warmsqueez/Warmsark and Springvale Platinum Warmsqueez/Warmsark, 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 7.2 *Pitched roofs*, Clause D10-D11.

CE marking

The Certificate holder has taken the responsibility of CE marking the products in accordance with harmonised European Standard BS EN 13163 : 2012. An asterisk (*) appearing in this Certificate indicates that data shown are given in the manufacturer's Declaration of Performance.

Technical Specification

1 Description

1.1 Springvale Warmsqueez/Warmsark and Springvale Platinum Warmsqueez/Warmsark (see Figure 1) comprise rigid, expanded polystyrene insulation bead boards used as insulation in tiled and slated pitched roof applications. The products have the nominal characteristics given in Table 1.

Figure 1 Example construction with Springvale Warmsqueez/Warmsark insulation boards between the rafters

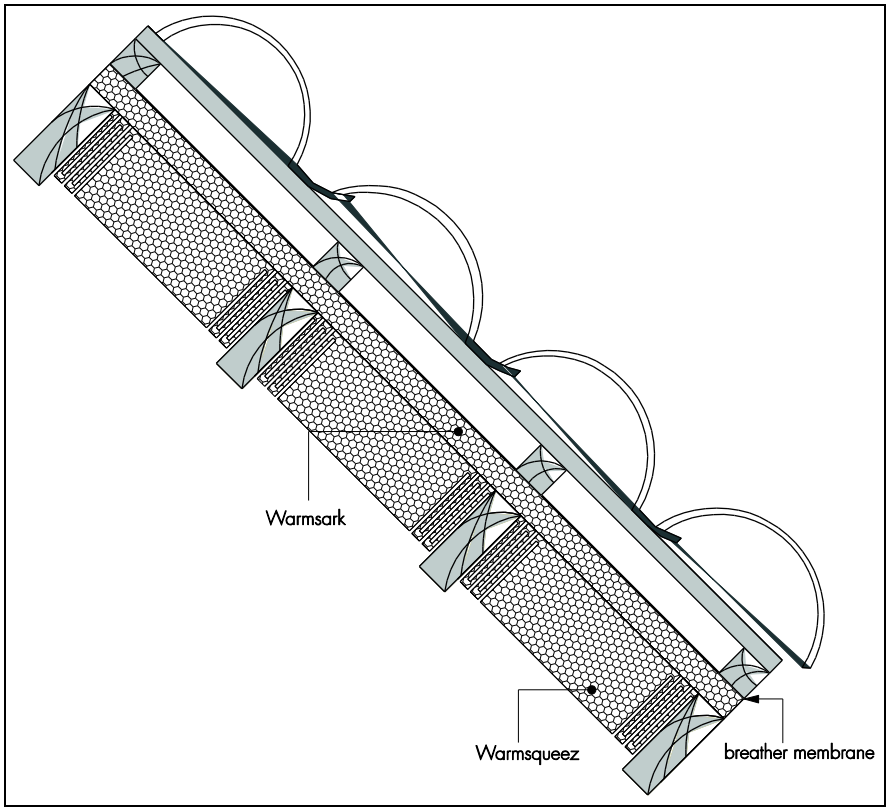
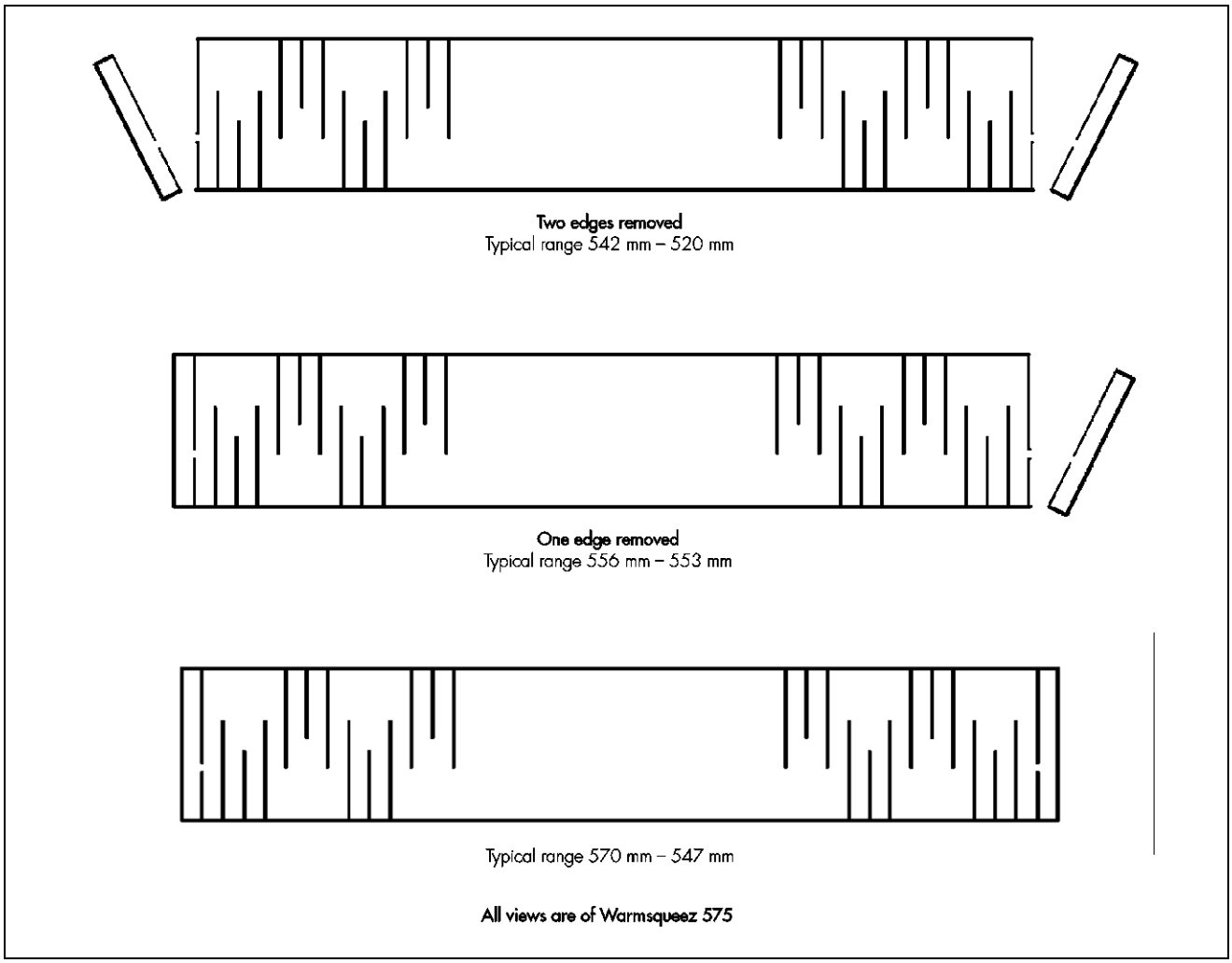


Table 1 Nominal characteristics

Characteristic (unit)	**Warmsqueez**	**Warmsark**
Length (mm)	1200	1200
Width (mm)	375, 425, 575	600
Thickness (mm)	75, 90, 100, 125, 150, 175, 200, 225	40 to 80
Edge profile	Plain	Plain or tongue-and-groove
Grade [based on compressive strength* at 10% (kPa)]	EPS (white) 70 E and Platinum 70 E	EPS (white) 100 E and Platinum 100 E
Water vapour resistivity ($MN \cdot s \cdot g^{-1} \cdot m^{-1}$)	Minimum 145	Minimum 200

1.2 Springvale Warmsqueez boards (see Figure 2) are longitudinally slit and, when installed between rafters, compress across their width to ensure a tight fit. Fixings are not required to retain the boards once fitted. Removable edge strips increase the variation in rafter spacing that the boards can accommodate.

Figure 2 Warmsqueez adjustments



1.3 Ancillary products for use with the boards, but outside the scope of this Certificate, include:

- roof tile underlay — must be fully-supported, vapour permeable and the subject of a current BBA Certificate
- Proctor PR nail, or Helifix 600 Inskew
- galvanized nails
- treated counter battens
- tiling laths
- plasterboard lining to BS EN 520 : 2004
- vapour control layer (VCL).

2 Manufacture

2.1 The products are manufactured from polystyrene beads using conventional moulding techniques.

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 Springvale EPS Ltd has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 by BSI and BS EN ISO 14001 : 2004 by QMS (Certificates FM13871 and 14130944 respectively).

3 Delivery and site handling

3.1 The products are delivered to site in packs wrapped in polythene. The product's name, grade and the BBA logo incorporating the number of this Certificate are printed on the labels.

3.2 The products must be protected from prolonged exposure to sunlight and should be stored under cover or protected with light-coloured, opaque polythene sheets. They must be stored flat and off the ground on a clean, level surface.

3.3 The products must not be exposed to naked flame or other ignition sources, or to solvents or other chemicals.

3.4 The products are light and easy to handle, and care should be exercised to avoid crushing the edges or corners. If damaged, the products should be discarded

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Springvale Warmsqueez/Warmsark and Springvale Platinum Warmsqueez/Warmsark.

Design Considerations

4 General

4.1 Springvale Warmsqueez/Warmsark and Springvale Platinum Warmsqueez/Warmsark are suitable for use as insulation where the ceiling follows the pitch of the roof and encloses a habitable space, or where the ceiling is horizontal and encloses a loft space. The products must be used in conjunction with a suitable water vapour permeable roof tile underlay and a VCL.

Between rafters only, or between and above rafters, or between and below rafters

4.2 Warmsqueez (installed between rafters) and Warmsark (installed over rafters) are satisfactory for use as a thermally insulating roof insulation system. The products are used in conjunction with each other, or Warmsqueez may be used on its own.

4.3 Other necessary items include: a roof tile underlay (see the *Installation* part of this Certificate), timber counter battens, and tiling battens in tiled or slated pitched roofs, all designed and constructed in accordance with the relevant clauses of BS 5534 : 2014 for dwellings or other buildings with similar temperature and humidity conditions.

Triple layers: above, between and below rafters

4.4 In order to achieve lower U values (see Table 2), a triple-layer-option is possible, with Warmsark Platinum above and below the rafters and Warmsqueez Platinum between the rafters.

4.5 Roofs should be designed and constructed, and tiled and slated, in accordance with BS 5534 : 2014.

4.6 During installation, the boards must not be walked on except over supporting roof timbers. Warmsark boards must not be considered as an alternative to timber sarking.

4.7 It is essential that detailing and jointing of the boards achieves a convection-free envelope of high vapour resistance (see section 12.1). Any gaps should be filled, for example with expanding polyurethane foam. Ridges, abutments and other penetrations should also be sealed. Flue pipes passing through the insulation must be suitably sleeved.

4.8 If Warmsqueez is used by itself, or with Warmsark below the rafters, it is installed flush with the internal top of the rafters. A suitable low resistance (Type LR) vapour permeable roof tile underlay may be laid over the insulation boards

without a ventilated airspace. When using a high resistance (Type HR) underlay, a minimum gap of 50 mm thickness from eaves to ridge must be provided below it and ventilated in accordance with BS 5250 : 2011.

5 Practicability of installation

The products are designed to be installed by a competent general builder, or contractor, experienced with these types of products.

6 Thermal performance

6.1 Calculations of thermal transmittance (U value) should be carried out in accordance with BS EN ISO 6946 : 2007 and BRE Report BR 443 : 2006 using the thermal conductivities (λ_D) of 0.037 and 0.030 $W \cdot m^{-1} \cdot K^{-1}$ for the white and Platinum Warmsqueez respectively, and 0.035 and 0.030 $W \cdot m^{-1} \cdot K^{-1}$ for the white and Platinum Warmsark respectively.

6.2 The U value of a roof will depend on the thickness of additional insulation used, the extent and arrangement of timber bridging and the insulating value of other roof components/layers. Some example U values of roofs incorporating the products are shown in Tables 2 and 3.

Table 2 Example U values for pitched roof applications(1)

		U value ($W \cdot m^{-2} \cdot K^{-1}$)	
Option	**Insulation thickness (mm)**	**rafters at 400 mm centres**	**rafters at 600 mm centres**
Warmsark white + Warmsqueez white	60 + 100	0.24	0.23
	60 + 150	0.19	0.18
	40 + 200	1.18	0.17
	75 + 200	0.15	0.14
Warmsark Platinum + Warmsqueez Platinum	60 + 100	0.21	0.20
	60 + 150	0.16	0.16
	40 + 200	0.15	0.14
	75 + 200	0.13	0.12

(1) Fixings cross section – 5.0 mm^2; number of fixings above rafters – 8 per m^2; lambda value of fixings – 50.0 $W \cdot m^{-1} \cdot K^{-1}$.

Table 3 Example U value for a triple-layer pitched roof application

Option	**Insulation**	**insulation thickness (mm)**	**U value ($W \cdot m^{-2} \cdot K^{-1}$)**		**insulation thickness (mm)**	**U value ($W \cdot m^{-2} \cdot K^{-1}$)**	
			rafters at 400 mm centres	**rafters at 600 mm centres**		**rafters at 400 mm centres**	**rafters at 600 mm centres**
Above rafters(1)	Warmsark Platinum	60	0.12	0.12	80	0.11	0.10
Between rafters	Warmsqueez Platinum	150			150		
Below rafters(2)	Warmsark Platinum	60			80		

(1) Fixings per m^2 above rafters: 8 (as given by manufacturer).
(2) Fixings per m^2 below rafters: 4 (as given by manufacturer).

Junctions

6.3 The product can contribute to maintaining continuity of thermal insulation at junctions with other elements and minimise thermal bridges and air infiltration. Detailed guidance can be found in the documents supporting the national Building Regulations. Advice can also be sought from the Certificate holder.

7 Condensation risk

Interstitial condensation

7.1 Roofs will adequately limit the risk of interstitial condensation when designed and constructed in accordance with BS 5250 : 2011, Annexes D and H.

7.2 For the purposes of assessing the risk of interstitial condensation, the products' vapour resistivity may be taken as 145 $MN \cdot s \cdot g^{-1} \cdot m^{-1}$ at a minimum thickness of 75 mm for Warmsqueez products and 200 $MN \cdot s \cdot g^{-1} \cdot m^{-1}$ at a minimum thickness of 40 mm for the Warmsark products.

7.3 The risk of interstitial condensation is greatest when the building is drying out after construction. Guidance on preventing condensation from this and other sources is given in BRE Digest 369 and BRE Report BR 262 : 2002.

7.4 In all cases, where high vapour resistance roof tile underlays are used, ventilation to the air space should be in accordance with the recommendation of BS 5250 : 2011 or the relevant BBA Certificate for the roof tile underlay. When installed in conjunction with other insulation materials, the water vapour resistance and installation instructions of the additional insulation should be taken into consideration.

Surface condensation

7.5 Roofs will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed 0.35 $W \cdot m^{-2} \cdot K^{-1}$ 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.

7.6 Roofs 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 and the junctions with other elements are designed in accordance with BS 5250 : 2011, Annex H. Further guidance may be obtained from BRE Report BR 262 : 2002 and section 6.3 of this Certificate.

8 Strength and stability

8.1 The products, when installed in accordance with the Certificate holder's instructions will resist the loads likely to be met during installation and in service. During installation, care should be exercised to ensure that the products are not subjected to any construction or foot traffic loads. Roof timbers of adequate strength should be used to support such loads.

8.2 Resistance to wind uplift will depend largely on the building geometry and its geographical location and should be calculated in accordance with BS EN 1991-1-4 : 2005 and its UK National Annex. Snow loadings should be calculated in accordance with BS EN 1991-1-3 : 2003 and its UK National Annex.

8.3 The Certificate holder and fixing manufacturer must advise on the use of the correct proprietary fixings and fixing capacity. When considering this and calculating the fixing spacing required to resist the calculated loadings, the requirements of BS EN 1995-1-1 : 2004 and its UK National Annex must be followed.

9 Behaviour in relation to fire

9.1 The Certificate Holder has declared a fire classification class*E for the products, in accordance with BS EN 13501-1 : 2007.

9.2 When installed between rafters, the products are combustible but they will be contained between the roof and internal plasterboard lining until one is destroyed. Therefore, the insulation will not contribute to the development stages of a fire.

9.3 The products must not be carried over junctions between roofs required to provide a minimum period of fire resistance. The continuity of fire resistance must be maintained, as described in the national Building Regulations.

9.4 Elements must incorporate cavity barriers at edges, around openings, at junctions with fire-resisting elements and in cavities, in accordance with the relevant provisions of the national Building Regulations.

10 Maintenance

As the products are confined within the pitched roof by the overlay and have suitable durability (see section 11), maintenance is not required.

11 Durability

The products are durable, rot proof and sufficiently stable to remain effective as an insulation for the life of the building.

Installation

12 General

12.1 Installation should be in accordance with the relevant parts of BS 5534 : 2014 and the manufacturer's instructions. It may be carried out in all conditions normal to roof work but some difficulties in handling may be experienced in windy conditions.

12.2 The products are light to handle and can be easily cut, but care must be taken to prevent damage, particularly edge damage.

12.3 Since the products will not support the weight of operatives, appropriate care must be taken during installation and tiling.

12.4 It is important to ensure a tight fit between boards, between boards and rafters, and between boards and other detailed elements. At ridges and verges, boards should be cut to achieve tightly butted joints.

12.5 It is important to fill/seal gaps and joints in the insulation envelope, including at all service penetrations.

13 Procedure

13.1 Once the rafters have been set out, Warmsqueez boards are fitted between them, with the outer face flush with the outer edge of the rafters. Tear-off strips on long edges may be removed to facilitate fitting (see Figure 2). Boards are fitted from ridge to eaves and are fitted easily from the outside of the roof. Care should be taken to ensure continuity with wall insulation at eaves and verges. Gaps between insulation, and between insulation and any cavity closers, should be filled or sealed.

13.2 If required, a treated horizontal anchor batten the same thickness as the Warmsark boards is fixed to correspond with the first tile batten at the eaves. This anchor batten should preferably be outside the vertical line of the wall insulation. A continuous tilting fillet is fitted at the eaves to support the fascia board and the underlay.

13.3 Warmsark boards are fitted horizontally from anchor batten to ridge, ensuring the joints are staggered and the whole roof area is covered. Each board is secured with a single galvanized clout nail into a convenient rafter. At the ridge, boards are cut so that one sits on the other or butts tightly against the ridge board, where appropriate.

13.4 When the products are cut to fit around openings, eg at the roof perimeter, care should be taken to minimise gaps. Any gaps formed should be filled with expanded polyurethane foam.

13.5 The roof tile underlay is laid directly on the products, extending over the fascia to the gutter. Horizontal laps should be at least 100 mm and vertical laps should be at least one rafter's width.

13.6 For a high resistance roof tile underlay, a minimum 50 mm ventilated airspace must be maintained.

13.7 Treated counter battens (minimum 25 mm deep) are fixed at each rafter run from eaves to ridge using the proprietary fixings. A minimum 35 mm fixing penetration into the rafter should be maintained, or 38 mm if nails are used. Short lengths of counter batten should be tightly butted.

Technical Investigations

14 Investigations

14.1 Tests were carried out on Springvale Warmsqueez/Warmsark and Springvale Platinum Warmsqueez/Warmsark and the results assessed to determine:

- thermal conductivity
- dimensional stability
- water vapour permeability
- compressive strength
- minimum cross-breaking strength.

14.2 A calculation was undertaken to confirm the declared thermal conductivity.

14.3 A visit was made to a site in progress to establish the practicability of installation.

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

Bibliography

BRE Digest 369 *Interstital condensation and fabric degradation*

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

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

BS 5250 : 2011 + A1 : 2016 *Code of practice for control of condensation in buildings*

BS 5534 : 2014 + A1 : 2015 *Slating and tiling for pitched roofs and vertical cladding — Code of practice*

BS EN 520 : 2004 + A1 + 2009 *Gypsum plasterboards — Definitions, requirements and test methods*

BS EN 1991-1-3 : 2003 + A1 : 2015 *Eurocode 1 — Actions on structures — General actions — Snow loads*
NA to BS EN 1991-1-3 : 2003 + A1 : 2015 UK National Annex to *Eurocode 1 — Actions on structures — General actions — Snow loads*
BS EN 1991-1-4 : 2005 + A1 : 2010 *Eurocode 1 — Actions on structures — General actions — Wind actions*
NA to BS EN 1991-1-4 : 2005 + A1 : 2010 UK National Annex to *Eurocode 1 — Actions on structures — General actions — Wind actions*

BS EN 1995-1-1 : 2004 + A2 : 2014 *Eurocode 5 — Design of timber structures — General — Common rules and rules for buildings*

BS EN 13163 : 2008 *Thermal insulation products for buildings — Factory made products of expanded polystyrene (EPS) — Specification*

BS EN 13501-1 : 2007 + A1 : 2009 *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*

15 Conditions

15.1 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 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.

15.2 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.

15.3 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.

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

15.5 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.

15.6 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.

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