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**Agrément
 Certificate
 No 08/4526**

Designated by Government
 to issue
 European Technical
 Approvals

KNAUF ROCKSILK KRIMPACT FLAT ROOF SLAB RANGE

Isolation de toitures
 Dachwärmedämmung

Product



• THIS CERTIFICATE RELATES TO THE KNAUF ROCKSILK KRIMPACT FLAT ROOF SLAB RANGE, COMPRISING STONE MINERAL WOOL ROOF INSULATION BOARD WITH OR WITHOUT A GLASS-TISSUE LAYER ON ONE OR BOTH FACES.

• The products are for use as a thermal insulation layer on limited access flat roofs with concrete, timber or metal decks and is compatible with a wide range of waterproofing systems.

• The products are available in a range of thicknesses to suit different design requirements.

Regulations

1 The Building Regulations 2000 (as amended) (England and Wales)



The Secretary of State has agreed with the British Board of Agrément the aspects of performance to be used by the BBA in assessing the compliance of roof insulation with the Building Regulations. In the opinion of the BBA, Knauf Rocksilk Krimpact Flat Roof Slab Range, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting, the relevant requirements.

Requirement: **B4(2)**

Comment:

External fire spread

When used in conjunction with appropriate roof finishes, the products can meet this Requirement. See sections 10.3 and 10.4 of this Certificate.

Requirement: **C2(c)**

Comment:

Resistance to moisture

When used in conjunction with an appropriate vapour control layer the products are acceptable. See sections 12.1 and 12.2 of this Certificate.

Requirement: **L1(a)(i)**

Comment:

Conservation of fuel and power

The boards will enable a roof to meet the Target Emission Rate. See sections 11.2 to 11.5 of this Certificate.

Requirement: **Regulation 7**

Comment:

Materials and workmanship

The products are acceptable. See section 14 of this Certificate.

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



In the opinion of the BBA, Knauf Rocksilk Krimpack Flat Roof Slab Range, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Regulations and related Mandatory Standards as listed below.

Regulation:	8	Fitness and durability of materials and workmanship
Regulation:	8(1)	Fitness and durability of materials and workmanship
Comment:		The use of the products satisfy the requirement of this Regulation. See section 14 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards – construction
Standard:	2.8	Spread from neighbouring buildings
Comment:		When used in conjunction with appropriate roof decks and roof finishes, the products are unrestricted under this Standard, with reference to clause 2.8.1 ⁽¹⁾⁽²⁾ . See section 10.4 of this Certificate.
Standard:	3.15	Condensation
Comment:		When used in conjunction with an appropriate vapour control layer, the products will be unrestricted under this Standard, with reference to clauses 3.15.1 ⁽¹⁾ to 3.15.4 ⁽¹⁾ . See sections 12.1 and 12.3 of this Certificate.
Standard:	6.1(a)(b)	Carbon dioxide emissions
Standard:	6.2	Building insulation envelope
Comment:		The products can contribute to satisfying clauses, or parts of 6.1.1 ⁽¹⁾⁽²⁾ , 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 sections 11.2 to 11.5 of this Certificate.
		(1) Technical Handbook (Domestic).
		(2) Technical Handbook (Non-Domestic).

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



In the opinion of the BBA, Knauf Rocksilk Krimpack Flat Roof Slab Range, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Building Regulations as listed below.

Regulation:	B2	Fitness of materials and workmanship
Comment:		The products are acceptable. See section 14 of this Certificate.
Regulation:	C5	Condensation
Comment:		When used in conjunction with an appropriate vapour control layer, the products will be unrestricted under this Regulation. See section 12.1 of this Certificate.
Regulation:	E5	External fire spread
Comment:		When used in conjunction with appropriate roof decks and roof finishes, the products can satisfy this Regulation. See sections 10.3 and 10.4 of this Certificate.
Regulation:	F2(a)(i)	Conservation measures
Comment:		The products will enable a roof to satisfy the Elemental Method of limiting heat loss. See sections 11.2 to 11.5 of this Certificate.

4 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: *6 Delivery and site handling (6.2).*

Technical Specification

5 Description

5.1 Knauf Rocksilk Krimpack Flat Roof Slab Range comprises slabs of a rigid, stone mineral wool, treated with phenolic resin and oil, supplied either unfaced or with a layer of glass-fibre tissue on one face.

5.2 The unfaced product is used with mechanically-fixed systems only. The faced products are installed tissue side upwards, to assist the adhesive bonding between the insulation and the hot bitumen.

5.3 The slabs are available with nominal characteristics given in Table 1.

Table 1 Nominal characteristics

Product	Width (mm)	Length (mm)	Thickness (mm)	Density (kgm ⁻³)
Rocksilk Krimpack Flat Roof Slab	600	1800	50 to 160	130
Rocksilk Krimpack Flat Roof Extra	600	1800	50 to 120	180
Rocksilk Krimpack Adhered flat roof slab	600	1800	50 to 160	130

6 Delivery and site handling

6.1 The slabs are delivered to site on pallets. Depending on the thickness, a set number of slabs is loaded onto each pallet and the whole is shrink-wrapped. Each pallet carries a label bearing the marketing company's name, product code, batch number and the BBA identification mark incorporating the number of this Certificate.

6.2 Loaded pallets should be stored off the ground and under cover to protect them from precipitation.

Design Data

7 General

7.1 Knauf Krimpack Flat Roof Slab Range is suitable for use as a thermal insulation layer on warm-deck flat roofs with limited access with concrete, timber or metal decks.

7.2 Decks should be designed in accordance with the relevant clauses of BS 8217 : 2005, BS 6229 : 2003, BS 8218 : 1998 and, where appropriate, *NHBC Standards 2007*, Chapter 7.1, and *Zurich Building Guarantee Technical Manual 2007*, Section 4 *Superstructure*, Sub-section *Flat roofs*.

7.3 The roofs should incorporate an effective vapour control layer below the insulation.

7.4 The slabs are suitable for use with systems complying with one of the following waterproofing specifications:

- (a) fully-bonded, built-up bitumen felt Type 3 and/or Type 5 to BS 8747 : 2007 laid in accordance with BS 8217 : 2005.
- (b) mastic asphalt laid in accordance with BS 8218 : 1998
- (c) other waterproofing systems which are the subject of a current Agrément Certificate and laid in accordance with that Certificate.

7.5 Limited access roofs are defined for the purpose of this Certificate as those roofs subjected only to pedestrian traffic for maintenance of the roof, for example, covering and cleaning of gutters. Where traffic in excess of this is envisaged, special precautions such as additional protection to the membrane must be taken.

7.6 Flat roofs are defined for the purpose of this Certificate as those roofs having a minimum finished fall of 1:80. Pitched roofs are defined as those having falls in excess of 1:6.

7.7 When designing flat roofs, twice the minimum finished fall should be assumed, unless a detailed analysis of the roof is available, including, for example, overall and local deflection and direction of falls.

7.8 Tapered slabs may be used where appropriate, to achieve the minimum finished falls required.

8 Adhesion

When bitumen bonded, adhesion between the roofing slabs and vapour control layer, and between the roofing slabs and overlay, is adequate to resist the effects of wind suction and thermal cycling likely to be experienced in practice in normal conditions. In areas where high-wind speeds can be expected, mechanical fixing should be considered, and the advice of the Certificate holder should be sought as to the method of fixing. Reference may be made to BS 6399-2 : 1997 where a calculation is required for a specific building project.

9 Resistance to foot traffic

The slabs have adequate resistance to the loads associated with light maintenance traffic. If there is a likelihood of more severe traffic occurring, then additional precautions should be considered.

10 Properties in relation to fire

10.1 The fire rating of any roof containing the slabs will depend heavily on the type of deck and the nature of the roof waterproof covering.

10.2 The Certificate holder has declared the products are characterised as being Reaction to fire Class A1 rating when classified in accordance with EN 13501-1 : 2002.



10.3 When used for flat roofs incorporating the built-up felt specifications described in section 7.4(a) and with one of the surface finishes defined in Part iii of Table A5 of Appendix A of Approved Document B of The Building Regulations (England and Wales) or Technical Booklet E, Table 4.6, Part IV of The Building Regulations (Northern Ireland) (and listed below), the roof is deemed to be of designation AA.

Surface finishes:

- bitumen-bedded stone chippings covering the whole surface to a depth of not less than 12.5 mm
- bitumen-bedded tiles of a non-combustible material
- sand and cement screed, or
- macadam.



10.4 The designation of other specifications for example, when used on combustible substrates, should be confirmed by:

England and Wales

Test or assessment in accordance with Clause A1 of appendix A of Approved Document B

Scotland

Test to conform to Mandatory Standard 2.8, clause 2.8.1⁽¹⁾⁽²⁾

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

Northern Ireland

Test or assessment by a UKAS accredited laboratory, or an independent consultant with appropriate experience.

11 Thermal performance

11.1 Calculations of the thermal transmittance (U value) of a specific roof construction 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 for the products. Examples of U values are given in Table 2.

- (1) Building Research Establishment.

Table 2 Thermal performance ($Wm^{-2}K^{-1}$)

Product	λ value ($Wm^{-1}K^{-1}$)	Construction		
		Concrete deck	Timber deck	Metal deck
Krimpact Flat Roof Slab	0.038	0.30	0.29	0.33
Krimpact Flat Roof Extra	0.039	0.30	0.30	0.33



11.2 The roof system contributes to meeting the requirements of the national Building Regulations.

England and Wales and Northern Ireland

- 0.16 $Wm^{-2}K^{-1}$ required for 'notional' dwellings in SAP 2005 (see section 11.3)

- 0.25 $Wm^{-2}K^{-1}$ required for buildings other than dwellings in SBEM
- 0.25 $Wm^{-2}K^{-1}$ limiting average U value specified in Approved Documents; L1A (Table 2), L2A (Table 4), Technical booklets F1 (Table 2.2) and F2 (Table 2.4).

Scotland

- 0.16 $Wm^{-2}K^{-1}$ U value required for the 'notional' dwellings in SAP 2005 and the 'simplified approach — all fuel packages' in Mandatory Standard 6.1, clause 6.1.6⁽¹⁾ (see section 11.3)
- 0.20 $Wm^{-2}K^{-1}$ maximum average U value specified Mandatory Standard 6.2, in clause 6.2.1⁽¹⁾ (see section 11.3)
- 0.25 $Wm^{-2}K^{-1}$ U value required for 'notional' building in SBEM in Mandatory Standard 6.1, clause 6.1.3⁽²⁾
- 0.25 $Wm^{-2}K^{-1}$ maximum U value specified for the insulation
- 0.35 $Wm^{-2}K^{-1}$ limit value for the individual elements as per Mandatory Standard 6.2, clause 6.2.1⁽¹⁾⁽²⁾.

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

11.3 Where a proposed roof U value is greater than the 'notional' value specified in section 11.2, additional energy saving measures will be required in the building envelope and/or services in order to achieve the required overall carbon dioxide emission rate reduction of about 20% in dwellings (18% to 25% in Scotland) and 23% to 28% for buildings other than dwellings.

11.4 Compliance with the guidance referred to in section 11.5 will allow the use of the default psi values from Table 3 of BRE Information Paper IP 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) (use 'simplified approach' for Scotland).

11.5 The products can maintain, or contribute to maintaining, continuity of thermal insulation at junctions between roof and 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)

12 Condensation risk

Interstitial condensation



12.1 Roofs will adequately limit the risk of interstitial condensation when they are designed and constructed in accordance with BS 5250 : 2002, Section 8.4 and Appendix D.

Surface condensation



12.2 Roofs will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed $0.35 \text{ Wm}^{-2}\text{K}^{-1}$ at any point and the junctions with walls are designed in accordance with the relevant requirements of *Limiting thermal bridging and air leakage : accredited construction details for dwellings and similar buildings*, TSO 2002, or BRE Information Paper IP 1/06.



12.3 Roofs 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 BS 5250 : 2002, Section 8, and BRE report (BR 262 : 2002) *Thermal insulation: avoiding risks*.

13 Maintenance

Maintenance of the insulation layer will not be required provided the roof waterproof covering remains intact.

14 Durability



The products are rot-resistant and durable, and will have a life at least as long as that of the roof waterproofing.

Installation

15 General

15.1 Knauf Rocksilk Krimpact Flat Roof Slab Range must be installed in accordance with the manufacturer's instructions and BS 8217 : 2005 or BS 8218 : 1998, or the relevant Agrément Certificate, depending on the waterproofing to be applied.

15.2 Slabs can be cut and handled easily, although additional care may be required with the larger/heavier boards.

15.3 It is important to seal any exposed edges of the slabs, eg at roof vents and upstands, with waterproofing or hot bitumen in accordance with normal practice. Tapered slabs should be laid in accordance with the Certificate holder's layout drawing provided.

15.4 The vapour control layer must be installed in accordance with the manufacturer's instructions for each deck type.

15.5 To prevent moisture entrapment on or in the insulation, it is essential to protect the slabs during

laying prior to the application of the roof waterproofing, or to lay the roof covering at the same time as the slabs.

15.6 Once installed, access to the roof should be restricted in accordance with section 9.

16 Procedure

General (bitumen-bonded roof waterproofing)

16.1 Concrete deck joints and decks must be coated with bitumen primer to BS 3416 : 1991, when the vapour control layer is bitumen bonded to the deck.

16.2 The bitumen felt vapour control layer must be fully bonded with hot bitumen as described in the appropriate part of BS 8217 : 2005. Care should be taken to ensure continuity at joints, upstands and roof penetrations.

16.3 On timber decks the vapour control layer is nailed to the deck, in accordance with BS 8217 : 2005 or bitumen bonded using traditional techniques.

16.4 The slabs are laid with the glass-tissue layer uppermost and provide surfaces suitable for effective bitumen bonding [see section 7.4(a) and (b)]. In particular, surfaces must be dry and clean, and the ambient temperature above 5°C , unless suitable precautions are taken against condensation.

16.5 Hot bitumen is mopped over the vapour control layer and the slabs are bedded into it as work proceeds. The slabs should be laid broken bond (ie staggered). On metal roofs, slabs will span trough widths given in Table 3. The deck profiles should give a bonding area of at least 33% of the total projected surface area.

Table 3 Trough widths

Insulation thickness (mm)	Maximum span (mm)	
	Slab ends supported on profile tops	Slab ends unsupported over troughs
50	170	120
60	180	140
70	200	160
75	210	170
80	220	180
160	220	200

16.6 Only sufficient slabs should be laid that can be waterproofed in the same working period using the methods described in section 7.4.

16.7 On metal decks of tall buildings or in areas subjected to high wind loads, additional mechanical fixings may be required, using appropriate fixings at the ratio per slab specified in the manufacturer's instructions. Advice can also be sought from the Certificate holder's Technical Advisory Centre.

Mechanically fixed systems (non-bitumen bonded)

16.8 Advice from a manufacturer of single-ply membranes should be sought to confirm compatibility with the unfaced product

16.9 Slabs should be held in place initially, with one fixing per slab in the centre of the board. Further fixing will depend upon the guidance of the membrane manufacturer.

16.10 Where more than five fixings per slab are required, ie dependent upon the design wind load, advice should be sought from the fixing manufacturer, for the number of fixings for the application concerned.

16.11 The roof waterproofing is then applied in the manner described in section 7.4(c).

Tapered boards — all decks

16.12 Pre-cut slabs, tapered to the required falls, are labelled in accordance with the Certificate holder's layout drawing for the building concerned.

16.13 To provide a uniform fall, it is essential that the deck is even and true. Features, such as hollows, backfalls and depressions, must be rectified prior to laying the boards.

16.14 Slabs are laid sequentially in accordance with the position code on the layout drawing. Laying for the main area should commence at the apex line(s) of the roof. To avoid error, it is advisable to temporarily position each slab prior to bonding.

16.15 Installation of tapered slabs is otherwise as described for the standard slabs.

Technical Investigations

The following is a summary of the technical investigations carried out on Knauf RocksilK KrimpaK Flat Roof Slab Range.

17 Investigations

17.1 Tests were carried out by the BBA on:

- density
- compressive strength
- behaviour under distributed static loading (80°C)
- behaviour under concentrated static loading
- bowing under a thermal gradient
- ash content.

17.2 An examination was made of independent data relating to thermal conductivity and behaviour under compression were examined.

Bibliography

BS 3416 : 1991 *Specification for bitumen-based coatings for cold application, suitable for use in contact with potable water*

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

BS 6229 : 2003 *Flat roofs with continuously supported coverings — Code of practice*

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

BS 8217 : 2005 *Reinforced bitumen membranes for roofing. Code of practice*

BS 8218 : 1998 *Code of practice for mastic asphalt roofing*

BS 8747 : 2007 *Reinforced bitumen membranes (RBMs) for roofing. Guide to selection and specification*

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

EN 13501-1 : 2002 *Fire classification of construction products and building elements. Classification using test data from reaction to fire tests*

Conditions of Certification

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 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.

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.



In the opinion of the British Board of Agrément, Knauf Krimpact Flat Roof Slab Range is fit for its intended use provided it is installed, used and maintained as set out in this Certificate. Certificate No 08/4526 is accordingly awarded to Knauf Insulation Ltd.

On behalf of the British Board of Agrément

Head of Approvals
— Physics

Chief Executive

Date of First issue: 10 March 2008

