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European Technical
Approvals

Product

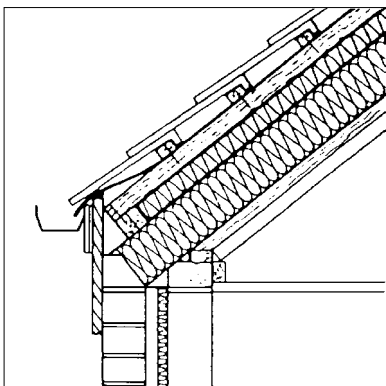
• THIS CERTIFICATE OF CONFIRMATION RELATES TO WARM-R HYLOC PITCHED ROOF INSULATION, A WARM ROOF INSULATION SYSTEM USING EXPANDED POLYSTYRENE BOARD.

• The system is for use as thermal insulation above and between rafters for tiled or slated pitched roofs designed and constructed in accordance with the relevant clauses of BS 5534 : 2003.

• The system must be used in conjunction with a suitable water vapour permeable roof tile underlay.

• The system is for use where the ceiling follows the pitch of the roof and encloses a habitable space, or where the ceiling is horizontal and encloses a habitable loft space.

Confirmation of Irish Agrément Certificate No 95/0065 issued by the Irish Agrément Board, EOLAS, Glasnevin, Dublin 9, Ireland.



WARM-R HYLOC PITCHED ROOF INSULATION

Sous-toiture isolants
Dachlattung

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, Warm-R Hyloc Pitched Roof Insulation, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements.

Requirement: B3(2)	Internal fire spread (structure)
Comment:	Junctions between roofs and compartment walls must be fire-stopped. See section 10.2 of this Certificate.
Requirement: B4(2)	External fire spread
Comment:	The product will not affect the external fire rating of a tiled or slated roof in which it is installed. See section 10.3 of this Certificate.
Requirement: F2	Condensation in roofs
Comment:	The product is acceptable. See section 12.1 of this Certificate.
Requirement: L1	Dwellings
Requirement: L2	Buildings other than dwellings
Comment:	The product can meet or contribute to meeting these Requirements. See sections 11.2 to 11.4 of this Certificate.
Requirement: Regulation 7	Materials and workmanship
Comment:	The product is acceptable. See section 15 of this Certificate.

2 The Building Standards (Scotland) Regulations 1990 (as amended)

In the opinion of the BBA, Warm-R Hyloc Pitched Roof Insulation, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Regulations and related Technical Standards as listed below.

Regulation: 10	Fitness of materials and workmanship
Standard: B2.1	Selection and use of materials, fittings, and components, and workmanship
Comment:	The product can contribute to a construction meeting this Standard. See the <i>Installation</i> part of this Certificate.
Standard: B2.2	Selection and use of materials, fittings, and components, and workmanship
Comment:	The product is an acceptable material. See section 15 of this Certificate.
Regulation: 12	Structural fire precautions
Standard: D3.16	Compartmentation — Junctions
Standard: D5.10	Separating walls and separating floors — Junctions
Comment:	Junctions between roofs and compartment walls, separating walls or walls enclosing a protected zone must be fire-stopped. See section 10.2 of this Certificate.
Standard: D9.1	Fire spread from adjoining buildings
Comment:	The product will not affect the external fire rating of a tiled or slated roof in which it is incorporated. See section 10.3 of this Certificate.
Regulation: 18	Resistance to condensation
Standard: G4.1	Condensation — Interstitial condensation
Standard: G4.2	Condensation — Surface condensation
Comment:	The product is acceptable. see section 12.1 of this Certificate.

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Regulation:	22	Conservation of fuel and power
Standard:	J3.1	Buildings in purpose group 1 — Building fabric
Standard:	J4.1	Buildings in purpose group 1 — Limiting thermal bridging at junctions and around openings
Standard:	J8.1	Buildings in purpose groups 2 to 7
Standard:	J9.1	Buildings in purpose groups 2 to 7 — Limiting thermal bridging at junctions and around openings
Comment:		The product can satisfy or contribute to satisfying these Standards. See sections 11.2 to 11.4 of this Certificate.

3 The Building Regulations (Northern Ireland) 2000



In the opinion of the BBA, Warm-R Hyloc Pitched Roof Insulation, 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 product is acceptable. See section 15 of this Certificate.
Regulation:	C5	Condensation
Comment:		The product is acceptable. see section 12.1 of this Certificate.
Regulation:	E4	Internal fire spread — Structure
Comment:		Junctions between roofs and compartment walls must be fire-stopped. See section 10.2 of this Certificate.
Regulation:	E5	External fire spread
Comment:		The product will not affect the external fire rating of a tiled or slated roof in which it is incorporated. See section 10.3 of this Certificate.
Regulation:	F2	Building fabric
Comment:		The product can satisfy or contribute to satisfying this Regulation. See sections 11.2 to 11.4 of this Certificate.

4 Construction (Design and Management) Regulations 1994 (as amended) Construction (Design and Management) Regulations (Northern Ireland) 1995 (as amended)

Information in this Certificate may assist the client, planning supervisor, designer and contractors to address their obligations under these Regulations.

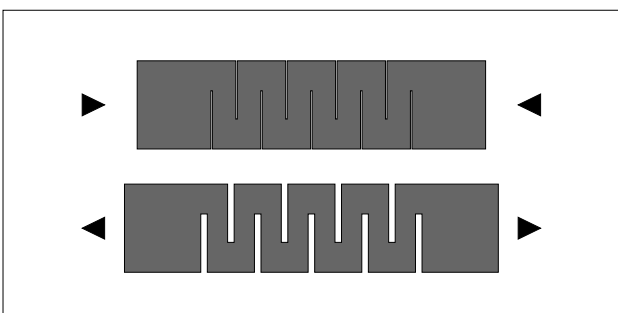
See sections: *6 Delivery and site handling* (6.3 and 6.4) and *16 General — Installation* (16.2).

Technical Specification

5 Description

5.1 Warm-R Hyloc Pitched Roof Insulation consists of boards of expanded polystyrene manufactured in accordance with BS EN 13163 : 2001, Section 4.2 and the relevant parts of Section 4.3. It is a two-layer system of Hyloc Panels and Plus panels, which are either slotted or tongue-and-groove (see Figure 1).

Figure 1 Hyloc width adjustment feature



5.2 The system is available with the nominal characteristics given in Table 1.

Table 1 Nominal characteristics

	Hyloc Panel	Plus Panel
Length (mm)	1200	1200
Width (mm)	To suit designed rafter centres	600
Thickness (mm)	75–130 in 5 mm increments	40,50,60 Tongue-and-groove
Grade	EPS 70 class E or F	EPS 100 class E or F
Density (kgm ⁻³)	15	20
Use	between rafters	over rafters

5.3 Ancillary products used with the boards:

- water vapour permeable roof tile underlay
- InSkew type fixings or other similar spiral fixings
- galvanized slab nails or ring-shank nails.

5.4 Proprietary fixings approved by the BBA can be used with the boards. Names and addresses of suppliers of approved fixings are available from the Certificate holder and the BBA.

6 Delivery and site handling

6.1 The boards are delivered to site in polythene wrapped packs. Each pack bears the manufacturer's trade name and the BBA identification mark incorporating the number of this Certificate. Each board is marked with the name and grade.

6.2 The boards should be stored under cover or protected with opaque polythene sheeting. Prolonged exposure to sunlight causes degradation and breakdown of the surface.

6.3 When large volumes are stored, particularly if indoors, the boards must not be exposed to elevated temperatures. Adequate ventilation may be required.

6.4 The boards must not be exposed to open flame or other ignition sources. Care must be taken to prevent contact with liquid solvents and bitumen or mastic products.

6.5 Care must be exercised when handling individual boards to avoid crushing the edges or corners.

Design Data

7 General

7.1 Warm-R Hyloc Pitched Roof Insulation is satisfactory for use in conjunction with internal lining board, vapour permeable roof tile underlay, timber counter battens and tiling battens in tiled or slated, pitched roofs, designed and constructed in accordance with the relevant clauses of BS 5534 : 2003 for dwellings or other buildings with similar temperature and humidity conditions.

7.2 The boards are for use in constructions 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.

7.3 Although the boards will contribute to the buckling and racking strength of the roof, normal cross-bracing is necessary.

7.4 The boards must not be walked on except over supporting roof timbers. The panels have insufficient nail holding ability and should not be considered as an alternative to timber sarking.

7.5 It is essential that detailing and jointing of the boards achieves a convection-free envelope of high vapour resistance (see section 13). Any gaps should be filled, eg, with an in-situ polyurethane expanding foam. Ridges, abutments and penetrations should also be sealed. Flue pipes passing through the insulation should be suitably sleeved.

8 Strength

The boards will resist the loads likely to be met during installation and in service. See sections 7.4 and 16.2


9 Structural stability

9.1 The resistance to wind uplift and likely dead loads depends upon factors peculiar to each project, eg roof geometry and geographical location. The effect of wind loading should be calculated in accordance with BS 6399-2 : 1997 and snow loadings should be calculated in accordance with BS 6399-3 : 1988 for each case.

9.2 When calculating the fixing spacing required to resist the calculated loadings the requirements of BS 5268-2 : 2002 should be followed where possible. The Certificate holder can advise on the use of the correct proprietary fixings and improved nails in accordance with the requirements of BS 5268-2 : 2002.

10 Behaviour in relation to fire

10.1 The boards melt when exposed to excessive heat and are classified as Class E or Class F and are combustible, however the increase in the fire load in the building consequent to their use is small.

 10.2 The boards 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, paragraphs 9.28 to 9.31

Scotland

Technical Standards (D3.16) and (D5.10)

Northern Ireland


Technical Booklet E, paragraph 3.15.

10.3 The use of the boards will not affect the rating obtained by tiled or slated roofs when evaluated by assessment or tested to BS 476-3 : 1958.

10.4 When installed with an internal lining board eg 12.5 mm thick plasterboard, the insulation will be contained between the roof and internal lining board until one is destroyed. Therefore, the insulation will not contribute to the development stages of a fire or present a smoke or toxic hazard.

11 Thermal insulation

11.1 For the purpose of U value calculations to determine if the requirements of the Building (or other statutory) Regulations are met, the thermal conductivity of the insulation ($\lambda_{90/90}$ value) as declared by the Certificate holder may be taken as 0.037 Wm⁻¹K⁻¹ for EPS 70 or 0.036 Wm⁻¹K⁻¹ for EPS 100.

 11.2 The requirement for limiting heat loss through the building fabric can be satisfied if U values of the building elements (including thermal bridging) do not exceed the maximum

values in the relevant Elemental Method given in national Building Regulations:

England and Wales

Approved Documents L1 and L2, Table 1

Scotland

Technical Standards J3.2, Table 1 and J8.3, Table

Northern Ireland

Technical Booklet F, Tables 1.2 and 1.4.

11.3 Guidance is also given in these documents on selecting the thickness of insulation required to enable a roof to achieve the desired U value. Alternative approaches are also described which allow for some flexibility in design of U values for individual constructional elements.

11.4 Care should be taken to ensure that the design allows for limiting excessive additional heat loss and risk of surface condensation at openings within the boards and at junctions between the boards and other building elements. Reference can be made to *Limiting thermal bridging and air leakage : Robust construction details for dwellings and similar buildings*, TSO 2002 or BR 262 : 2002 *Thermal insulation : avoiding risks*.

12 Condensation



12.1 The risk of interstitial condensation will be minimal under normal conditions of use.

The boards have an intrinsically high vapour resistance and when installed with tightly butted joints and filled/sealed gaps, will provide a continuous convection-free envelope of high vapour resistance. Therefore, a suitable vapour permeable roof tile underlay may be laid over the insulation boards without ventilated air space.

12.2 Where high humidities may be expected, or where Hyloc Panels only are used, a vapour control layer should be used unless a condensation risk analysis in accordance with BS 5250 : 2002 shows that it is not necessary.

12.3 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 Report 262 *Thermal insulation : avoiding risks* and BRE Digest 369 *Interstitial condensation and fabric degradation*.

12.4 Where boards are installed in a roof with an existing horizontal ceiling, a 'warm roof' space is created and ventilation is not required. Any insulation at horizontal ceiling level, however, should be removed.

13 Resistance to moisture

The boards will not be adversely affected by rain during installation, nor by wind-driven snow or rain penetrating the tiling in service. Water absorption is low and its influence on the λ value is minimal.

14 Maintenance and repair

Damaged boards can be replaced prior to the installation of counter battens or timber sarking.

15 Durability



The boards are rot proof, stable and durable and will have a life equivalent to that of the roof structure in which they are incorporated.

Installation

16 General

16.1 Installation of Warm-R Hyloc Pitched Roof Insulation must be in accordance with the relevant clauses of BS 5534 : 2003 and the Certificate holder's instructions. It may be carried out in all conditions normal to roof work, but in windy conditions handling difficulties may be experienced.

16.2 The boards can be cut easily but care must be taken to prevent damage. Since the boards will not support the weight of operatives, appropriate care must be taken during installation and tiling. Damaged boards must not be used.

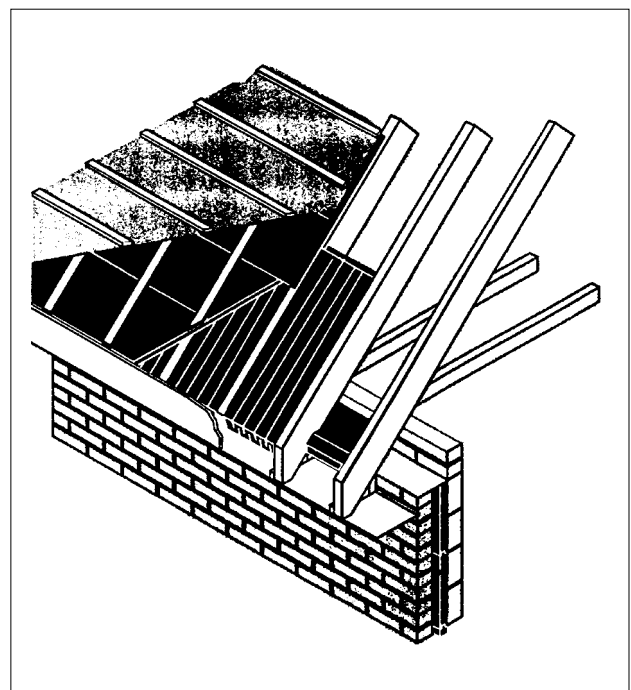
16.3 Where the system is installed in traditional and timber framed construction, cavity barriers at the junction of the external wall and roof space should be provided.

16.4 It is important to fill/seal gaps and joints in the insulation envelope (see section 7.5).

17 Procedure

17.1 The first run of Hyloc Panels is fitted between rafters keeping panels flush with the top face of the rafter and closely butted at ends, commencing at the eaves (see Figure 2).

Figure 2 Two-layer pitched roof system



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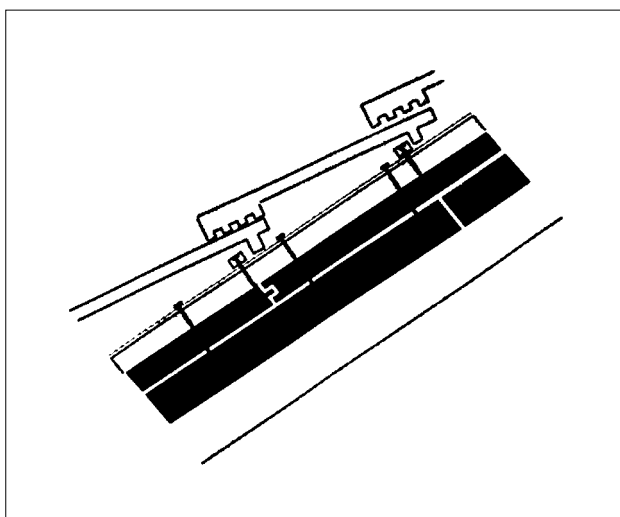
17.2 The first run of Plus Panels is laid over the rafters running across the roof and held in position by a counter batten (44 mm by 35 mm) lightly tacked in place along the line of the rafters.

17.3 Remaining runs of Plus Panels are positioned with the tongue-and-groove fully engaged and vertical joints staggered.

17.4 The procedure is repeated using crawling boards until both layers reach ridge level. The counter batten must be nailed firmly in place.

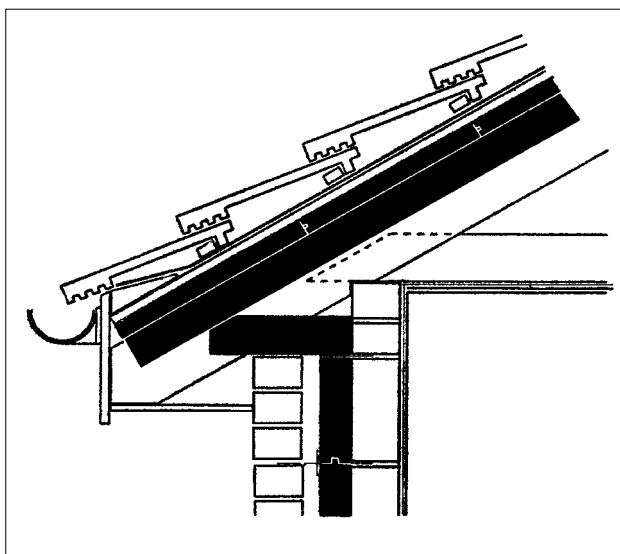
17.5 Batten fixing to meet wind uplift and loading requirements may vary with environmental conditions in different areas and must be in accordance with BS 5534 : 2003 and BS 6399-2 : 1997 (see Figure 3).

Figure 3 Typical fixing method



17.6 Roof tile underlay is positioned over the counter battens. The underlay should have adequate water vapour permeability and should allow drainage of water over the fascia board and into the gutter at eaves. A continuous timber fillet to support the felt below the lowest row of tiles is recommended (see Figure 4).

Figure 4 Overhanging eaves detail



17.7 When the roof space is used as a living area, Hyloc Plus should be covered from the inside with a minimum 500 gauge polyethylene vapour control layer with sealed laps and 12.5 mm plasterboard or other class of approved material to provide adequate fire protection.

17.8 When boards are cut to fit around openings, for example, at the roof perimeter; care should be taken to minimise any gaps. Any that are formed should be filled with expanded foam.

Finishing

17.9 Roof tiles or slates are installed in accordance with the relevant clauses of BS 5534 : 2003.

17.10 Internal lining panels, eg minimum 12.5 mm plasterboard appropriate to the application and required decoration, are applied.

Technical Investigations

The following is a summary of the technical investigations carried out on Warm-R Hyloc Pitched Roof Insulation.

18 Tests

As part of the assessment by the Irish Agrément Board, tests and assessments were carried out to determine:

- density
- water vapour resistance
- water uptake
- dimensional accuracy
- compressive and cross-breaking strength
- dimensional stability
- thermal conductivity
- efficiency of the construction process.

19 Investigations

An examination was made of test data to BS EN 13163 : 2001 relating to:

- dimensions
- squareness
- flatness
- density
- λ value
- compressive strength at 10% compression.

20 Other investigations

The technical data in the Agrément issued by the Irish Agrément Board were evaluated in the context of UK practice, conditions and building regulations.

Additional Information

Hytherm (Ireland) Limited have declared the designation codes (see Table 2) in accordance with Section 6 of BS EN 13163 : 2001.

Table 2 Certificate holder's declared designation codes/level or class — BS EN 13163 : 2001

	Hyloc Panel EPS 70	Plus Panel EPS 100
Length	L1	L1
Width	W1	W1
Thickness	T1	T1
Squareness	S1	S1
Flatness	P3	P3
Compressive stress at 10% deformation	CS(10)70	CS(10)100
Dimensional stability at 23°C/50% RH	DS(N)2	DS(N)2
Dimensional stability at 23°C/90% RH	DS(23,90)1	DS(23,90)1
Water absorption by immersion ⁽¹⁾		
total (%)	WL(T)5	WL(T)5
partial (kgm ⁻²)	0.06	0.08
Bending strength	BS115	BS150
Thermal conductivity ($\lambda_{90/90}$ value) (Wm ⁻¹ K ⁻¹)	0.037	0.036

(1) For 50 mm thickness.

Bibliography

BS 476-3 : 1958 *Fire tests on building materials and structures — External fire exposure roof test*

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

BS 5268-2 : 2002 *Structural use of timber — Code of practice for permissible stress design, materials and workmanship*

BS 5534 : 2003 *Code of practice for slating and tiling (including shingles)*

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

BS 6399-3 : 1988 *Loading for buildings — Code of practice for imposed roof loads*

BS EN 13163 : 2001 *Thermal insulation products for buildings — Factory made products of expanded polystyrene (EPS) — Specification*

21 Conditions

21.1 This Certificate:

- (a) relates only to the product that is described, installed, used and maintained as set out in this Certificate;
- (b) is granted only to the company, firm or person identified on the front cover — no other company, firm or person may hold or claim any entitlement to this Certificate;
- (c) is valid only within the UK;
- (d) has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective;
- (e) is copyright of the BBA;
- (f) is subject to English law.

21.2 References in this Certificate to any Act of Parliament, Regulation made thereunder, Directive or Regulation of the European Union, Statutory Instrument, Code of Practice, British Standard, manufacturers' instructions or similar publication, are references to such publication in the form in which it was current at the date of this Certificate.

21.3 This Certificate will remain valid for an unlimited period provided that the product and the manufacture and/or fabrication including all related and relevant processes thereof:

- (a) are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA;

- (b) remain covered by a valid Irish Agrément; and
- (c) are reviewed by the BBA as and when it considers appropriate.

21.4 In granting this Certificate, the BBA is not responsible for:

- (a) the presence or absence of any patent, intellectual property or similar rights subsisting in the product or any other product;
- (b) the right of the Certificate holder to market, supply, install or maintain the product; and
- (c) the actual works in which the product is installed, used and maintained, including the nature, design, methods and workmanship of such works.

21.5 Any recommendations relating to the use or installation of this product which are contained or referred to in this Certificate are the minimum standards required to be met when the product is used. They do 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 or in the future; nor is conformity with such recommendations to be taken as satisfying the requirements of the 1974 Act or of any present or future 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 installation and use of this product.



In the opinion of the British Board of Agrément, Warm-R Hyloc Pitched Roof Insulation is fit for its intended use provided it is installed, used and maintained as set out in this Certificate. Certificate No 97/3417 is accordingly awarded to Hytherm (Ireland) Limited.

On behalf of the British Board of Agrément

Date of Second issue: 26th October 2004

Chief Executive

**Original Certificate issued on 29th October 1997. This amended version includes change of product name, reference to revised Building Regulations and Standards, addition of CDM Regulations, additional thermal insulation information and reference to BS EN 13163 : 2001 designation codes, and new Conditions of Certification.*

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For technical or additional information, contact the Certificate holder (see front page).
For information about the Agrément Certificate, including validity and scope, tel: Hotline 01923 665400, or check the BBA website.