IRISH AGRÉMENT BOARD
CERTIFICATE NO. 04/0022

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Hytherm Warm-R & Warm-R Premium Insulation Products

NSAI Agrément (Irish Agrément Board) is designated by Government to carry out European Technical Approvals.

NSAI Agrément Certificates establish proof that the certified products are **'proper materials'** suitable for their intended use under Irish site conditions and in accordance with TGD Part D of the second schedule of the **Building Regulations 1997 to 2024.**

PRODUCT DESCRIPTION:

This Certificate relates to the following products:

- Hytherm HD White, Hytherm HD E White & Hytherm SD White.
- Warm- R Premium HD E Grey & Warm- R SD E Grey.

This Certificate certifies compliance with the requirements of the Building Regulations 1997 to 2024.



MANUFACTURE AND MARKETING:

The product is manufactured and marketed by:

Unilin Insulation Ireland Ltd,
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Navan,
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Tel: +353 (46) 90 66050
Email: tech.ui@unilin.com
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Readers are advised to check that this Certificate has not been withdrawn or superseded by a later issue by contacting NSAI Agrément, NSAI, Santry, Dublin 9 or online at http://www.nsai.ie

Part One / Certification 1

1.1 ASSESSMENT
In the opinion of NSAI Agrément, the Hytherm insulation products described in this Certificate, if used in accordance with this Certificate, can meet the requirements of the Building Regulations 1997 to 2024, hereafter referred to as the Building Regulations in this Certificate as indicated in Section 1.2 of this Certificate.

1.2 BUILDING REGULATIONS 1997 to 2024.

Part A – Structure
A1 – Loading
Hytherm & Warm-R Underfloor Insulation Boards have adequate strength and stiffness to accept floor loads.

Part B – Fire Safety
B3 – Internal Fire Spread (Structure)
Part B Vol 2 – Fire Safety
B8 – Internal Fire Spread (Structure)

Hytherm & Warm-R Underfloor Insulation Boards shall be separated by solid non-combustible material not less than 200mm thick from any heating appliance or from any flue pipe or opening to a heating appliance.

Part C – Site Preparation and Resistance to Moisture
C4 – Resistance to Weather and Ground Moisture
The Hytherm & Warm-R insulation products described in this Certificate, when installed in compliance with the conditions indicated in Part 3 of this certificate, will not promote the passage of moisture and will minimise the risk of surface or interstitial condensation.

Part D – Materials and Workmanship
D3 – The Hytherm & Warm-R insulation products, as certified in this Certificate, are comprised of proper materials fit for their intended use (See Part 4 of this Certificate).

D1 – The Hytherm & Warm-R insulation products, as certified in this Certificate, meet the requirements of the building regulations for workmanship.

Part J – Heat Producing Appliances
J3 – Protection of Building
Hytherm & Warm-R Insulation Boards are combustible and when in proximity to a constructional hearth must be protected by 250mm of solid concrete or as detailed in TGD Part J Heating Appliances of the Building Regulations.

Part L – Conservation of Fuel and Energy – Dwellings
Part L – Conservation of Fuel and Energy – Buildings other than Dwellings

L1 - Conservation of fuel and energy
Based on the measured thermal conductivity of the Hytherm & Warm-R insulation products described in this Certificate, floors can meet current U-value requirements (see Part 4 of this certificate).

Part Two / Technical Specification and Control Data 2

2.1 PRODUCT DESCRIPTION

Hytherm & Warm-R Underfloor Insulation boards consist of rigid polystyrene boards cut from moulded blocks of EPS manufactured in accordance with I.S. EN 13163:2012+A2:2016 [1]. The boards are plain edge and should be laid tightly butting up to each other.

Hytherm & Warm-R Underfloor Insulation boards have been tested to ensure compliance with the requirements for compressive strength, water vapour transmission, thermal conductivity, thermal resistance and dimensional stability.

Length	1200, 1800 and 2400mm
Width	600 and 1200mm
Thickness	25 to 150mm
Grade	SD/HD/HDE for Hytherm (White EPS) HDE/ SDE for Warm-R (Grey EPS)

Table 1: Product Range

The boards do not contain CFC or HCFC gases and have zero Ozone Depletion Potential.

Table 1 shows the Hytherm Warm-R & Warm-R Premium Underfloor Insulation Boards product range.

2.2 MANUFACTURE
The Hytherm insulation products described in this Certificate are manufactured from polystyrene granules from external suppliers. The granules are expanded into blocks of EPS without the use of additional gases and cut to size from the block. Hytherm & Warm-R Underfloor Insulation boards are square edge.

Quality control checks include board dimensions, density, dimensional stability, compressive strength and thermal conductivity.

2.3 DELIVERY, STORAGE AND MARKING
Hytherm insulation boards are supplied in polyethylene shrink-wrapped packs. Each pack carries a label with the product description, product characteristics (λ and R

values), manufacturer's name, NSAI Agrément identification mark and NSAI Agrément Certificate number for the system.

Boards must be protected from prolonged exposure to sunlight, should be stored under cover in their original wrapping, not in contact with ground moisture and raised above ground level. If boards are stored outside, they should be raised above ground level and not in contact with ground moisture. Care must be taken to avoid contact with solvents and with materials containing volatile organic components such as coal tar, and newly treated timber.

The boards must not be exposed to a naked flame or other ignition sources.

2.4 INSTALLATION

2.4.1 Laying Below the Floor Slab

Where Hytherm or Warm-R Underfloor Insulation Boards are used below the floor slab, lay the hardcore in layers (150mm minimum – 225mm maximum) which should be well-compacted, with the surface blinded with quarry dust or sand to provide a suitable surface for laying a DPM. The DPM (minimum 1200 gauge polythene) should be laid over the blinding with joints taped to prevent the passage of ground moisture. The DPM should be carried up the wall until it meets and seals with the DPC.

Hytherm & Warm-R Underfloor Insulation Boards should be laid with tight butted joints, laid staggered in a break bonded pattern and fitted tightly at the edges and around any service penetrations.

Vertical upstands of insulation 25mm thick should be placed at the floor perimeter, party walls and internal rising walls to minimise thermal bridging.

Care should be taken to avoid damage to any installed insulation, DPM's and radon barriers as the slab is being poured, and operatives should make use of barrow runs and walkways whilst installation progresses to avoid damage.

2.4.2 Laying Below the Floor Screed

Where Hytherm & Warm-R Underfloor Insulation boards are used below the floor screed, the same procedure should be followed ensuring that the floor slab onto which the insulation is being laid is level.

The concrete floor over which the insulation is to be laid should be left as long as possible to maximise drying out in accordance with the relevant recommendations of BS 8203:2017 [2].

The minimum thickness of sand and cement screed is 65mm for domestic construction and 75mm for most other buildings. However, architectural specifications should be consulted.

2.4.3 Laying on Precast Block and Beam Floors

The floor surface should be smooth and flat, any irregularities should be removed. Lay a DPM to ensure that it is correctly positioned and turned up to meet the seal with the DPC.

Hytherm & Warm-R Underfloor Insulation boards should be laid with tightly butted and staggered joints. During construction, the Hytherm & Warm-R Underfloor Insulation boards must be protected from damage by moisture sources, water spillage, plaster droppings etc. Use scaffold boards to prevent wheelbarrow and other traffic damage to the boards. A 500 gauge polythene sheet should be laid over Hytherm & Warm-R Underfloor Insulation boards to prevent the wet screed from penetrating the joints between the insulation boards.

As in the case with solid ground floors, attention should be given to detailing to avoid thermal bridging.

All surfaces should be level to accept the Hytherm & Warm-R Underfloor Insulation boards. Uneven surfaces should be levelled prior to the laying of the floor.

2.4.4 Laying in Suspended Timber Floors

Hytherm & Warm-R Underfloor Insulation Boards should be cut to fit between the timber joists and be supported by carriers. These may be nails part driven into the side of the joists at selected levels, timber battens or proprietary saddle clips.

Where services need to be accommodated below the floor, Hytherm & Warm-R Underfloor Insulation boards can be lowered to provide an insulated duct.

Install flooring grade chipboard, ply or softwood timber flooring directly onto the joists, fixing in the normal manner.

Ensure that the void below the insulated suspended floor is well-ventilated and that the airflow is not restricted by sleeper walls.

2.4.5 Cutting

On-site trimming of boards where necessary to maintain continuity of insulation around opes is easily executed using a fine tooth saw or builder's knife.

Part Three / Design Data

3.1 GENERAL

Hytherm & Warm-R Underfloor Insulation boards, when installed in accordance with the manufacturer's install details and this certificate, are effective in reducing the 'U' value (thermal transmittance) of new and existing floor constructions.

Ground supported floors incorporating Hytherm & Warm-R Underfloor Insulation boards must include a suitable damp proof membrane laid in accordance with BS 8215:1991 [3] and BS 8102:2022 [4].

Suspended concrete ground floors incorporating Hytherm or Warm-R Underfloor Insulation boards must include suitable ventilation and the void should remain inaccessible to insects and rodents.

The overlay to Hytherm & Warm-R Underfloor Insulation boards should be:

- A cement based floor,
- A concrete slab or,
- Timber, OSB, or particleboard.

3.2 FLOOR LOADING

The design imposed loadings should be taken from I.S. EN 1991-1-1:2002/NA: 2013, Eurocode 1: Actions on structures - Part 1-1: General actions - Densities, self-weight, imposed loads for buildings [5].

Hytherm & Warm-R Underfloor Insulation boards, supported by chipboard or OSB, laid over joists or a screed can support these design loadings without undue deflection.

Where Hytherm & Warm-R Underfloor Insulation boards are used under a concrete slab, resistance to concentrated and distributed loads is a function of the slab specification.

3.3 UNDERFLOOR HEATING SYSTEMS

The maximum continuous working temperature of EPS is 80ºC. Where underfloor heating systems are to be used, advice of the Certificate holder should be sought.

3.4 WATERPROOFING

If an overlay of chipboard, OSB or similar material is to be used in bathrooms or kitchens, a continuous waterproof finish (e.g. vinyl) must be provided to protect it.

3.5 CE MARKING

The manufacturer has taken the responsibility of CE marking the products in accordance with harmonised standard I.S. EN 13163:2012+A2:2016, *Thermal insulation products for buildings -Factory made expanded polystyrene (EPS)products – Specification* [1]. An asterisk (*) appearing in this Certificate indicates that data shown is given in the manufacturer's Declaration of Performance (DoP).

Reference should be made to the latest version of the manufactures DoP for current information on any essential characteristics declared by the manufacturer.

Hytherm Warm-R & Warm-R Premium Underfloor Insulation Board

Part Four / Technical Investigations 4

4.1 BEHAVIOUR IN FIRE

Hytherm products achieves Class F and Warm-R products achieves Class E in accordance with IS EN 13501-1:2018 [6]. The boards are combustible and must be protected from naked flames and other ignition sources during and after installation. The boards when in proximity to a constructional hearth must be protected by 250mm of solid concrete, measured from the top surface of the hearth to the top surface of the boards, or as detailed in TGD Part J (Heat Producing Appliances) to the Building Regulations.

Toxicity – Negligible when used in a ground floor construction.

Hytherm & Warm-R Underfloor Insulation Boards are manufactured without the use of CFCs or HCFCs; there is no release of such gas on burning

4.2 STRENGHT

Hytherm& Warm-R Underfloor insulation boards when installed in accordance with the manufacturer's instructions, and this certificate, will resist the normal loads likely to be encountered during installation and in service.

4.3 RESISTANCE TO MOISTURE

Hytherm & Warm-R Underfloor insulation boards will not allow moisture to cross the floor construction provided it is installed in accordance with the manufacture's installation details and this certificate.

4.4 WATER VAPOUR PENETRATION AND CONDENSATION RISK

Hytherm & Warm-R Underfloor Insulation board have a water vapour diffusion resistivity factor 'μ' (Mu) of 20 to 40. The products have a significant resistance to the passage of water vapour.

4.5 THERMAL INSULATION

The aged thermal conductivity 'λ' (Lambda) value of Hytherm & Warm-R Underfloor Insulation boards, when measured in accordance with I.S. EN 12667:2001 [7], is 0.038* W/mK for Hytherm (EPS White) products and 0.031* W/mK for Warm-R (EPS Grey) products.

Backstop ground floor elemental U-values as described in TGD Part L to the Building Regulations can be obtained with Hytherm Warm-R & Warm-R Premium Underfloor Insulation Board constructions. Superior elemental ground floor U-value can often be required to achieve energy performance coefficient (EPC) and carbon performance coefficient (CPC) compliance.

The DoHLGH publication *Limiting Thermal Bridging & Air Infiltration – Acceptable Construction Details* [8] gives guidance on limiting cold bridging and should be referred to. When insulation is provided below a concrete slab, perimeter insulation having a minimum thermal resistance of 1.0 m^2K/W must be provided to limit heat loss due to thermal bridging. Where superior performances at thermally bridged locations are required, designers should engage the services of a NSAI registered thermal modeller.

4.6 DURABLITY

Hytherm & Warm-R Underfloor Insulation boards are rot proof and durable. As floor insulation, Hytherm & Warm-R Underfloor Insulation boards are judged to be stable and will remain effective as an insulation system for the life of the building, so long as it is installed in accordance with the manufacture's installation guide and this certificate.

4.7 TESTS AND ASSESSMENTS WERE CARRIED OUT TO DETERMINE THE FOLLOWING:

- Density
- Water vapour transmission
- Long term water absorption
- Dimensional accuracy
- Compressive strength
- Bending strength

- Dimensional stability
- Thermal conductivity
- Thermal resistance
- Efficiency of the construction process

4.8 OTHER INVESTIGATIONS

(i) Existing data on product properties in relation to fire, toxicity, environmental impact and the effect on mechanical strength/stability and durability were assessed.

(ii) 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.

(iii) Site visits were conducted to assess the practicability of installation and the history of performance in use of the product.

(iv) A condensation risk analysis was performed.

	Concrete Slab on Ground Floor		Suspended Beam & Block Concrete Floor (including 65mm screed)		Timber Suspended Floor (joist @400mm c/c)	
P/A Ratio	**U=0.18**	**U=0.21**	**U=0.18**	**U=0.21**	**U=0.18**	**U=0.21**
1	140	120	125	105	180	145
0.9	140	120	125	100	175	145
0.8	140	120	125	100	175	145
0.7	135	115	120	100	170	140
0.6	135	110	120	95	170	135
0.5	130	105	115	90	165	130
0.4	120	100	110	85	155	125
0.3	110	85	100	80	145	115
0.2	90	70	85	65	125	95
0.1	35	20	45	20	70	40

P/A = Perimeter/Area

Table 2: Ground Floor Construction Typical U Values (with Warm-R Premium)

I.S. EN 13163 [1] Essential characteristics for Hytherm Warm-R (EPS 100)		
Property	**Declared Value**	**Test Method**
Thermal conductivity	0.037*	EN 12667
Reaction to fire	Euroclass F*	EN 13501-1
Thickness	T2*	EN 823
Length	L2*	EN 822
Width	W2*	EN 822
Squareness	S2*	EN 824
Flatness	P3*	EN 824
Compressive Strength	CS (10/Y) 100*	EN 826

Table 3: Physical Properties of Hytherm Warm-R Underfloor Insulation Boards

I.S. EN 13163 [1] Essential characteristics for Hytherm Warm-R Premium		
Property	**Declared Value**	**Test Method**
Thermal conductivity	0.031*	EN 12667
Reaction to fire	Euroclass E*	EN 13501-1
Thickness	T2*	EN 823
Length	L2*	EN 822
Width	W2*	EN 822
Squareness	S2*	EN 824
Flatness	P3*	EN 824
Compressive Strength	CS (10/Y) 70*	EN 826

Table 4: Physical Properties of Hytherm Warm-R Underfloor Insulation Boards

5.1 National Standards Authority of Ireland ("NSAI") following consultation with NSAI Agrément has assessed the performance and method of installation of the product/process and the quality of the materials used in its manufacture and certifies the product/process to be fit for the use for which it is certified provided that it is manufactured, installed, used and maintained in accordance with the descriptions and specifications set out in this Certificate and in accordance with the manufacturer's instructions and usual trade practice. This Certificate shall remain valid for five years from date of issue so long as:

(a) the specification of the product is unchanged.

(b) the Building Regulations including any other regulation or standard applicable to the product/process, its use or installation remains unchanged.

(c) the product continues to be assessed for the quality of its manufacture and marking by NSAI.

(d) no new information becomes available which in the opinion of the NSAI, would preclude the granting of the Certificate.

(e) the product or process continues to be manufactured, installed, used and maintained in accordance with the description, specifications and safety recommendations set out in this certificate.

(f) the registration and/or surveillance fees due to NSAI Agrément are paid.

5.2 The NSAI Agrément mark and certification number may only be used on or in relation to product/processes in respect of which a valid Certificate exists. If the Certificate becomes invalid the Certificate holder must not use the NSAI Agrément mark and certification number and must remove them from the products already marked.

5.3 In granting Certification, the NSAI makes no representation as to:

(a) the absence or presence of patent rights subsisting in the product/process; or

(b) the legal right of the Certificate holder to market, install or maintain the product/process; or

(c) whether individual products have been manufactured or installed by the Certificate holder in accordance with the descriptions and specifications set out in this Certificate.

5.4 This Certificate does not comprise installation instructions and does not replace the manufacturer's directions or any professional or trade advice relating to use and installation which may be appropriate.

5.5 Any recommendations contained in this Certificate relating to the safe use of the certified product/process are preconditions to the validity of the Certificate. However, the NSAI does not certify that the manufacture or installation of the certified product or process in accordance with the descriptions and specifications set out in this Certificate will satisfy the requirements of the Safety, Health and Welfare at Work Act 2005, or of any other current or future common law duty of care owed by the manufacturer or by the Certificate holder.

5.6 The NSAI is not responsible to any person or body for loss or damage including personal injury arising as a direct or indirect result of the use of this product or process.

5.7 Where reference is made in this Certificate to any Act of the Oireachtas, Regulation made thereunder, Statutory Instrument, Code of Practice, National Standards, manufacturer's instructions, or similar publication, it shall be construed as reference to such publication in the form in which it is in force at the date of this certification.

NSAI Agrément

This Certificate No. **04/0022** is accordingly granted by the NSAI to **Unilin Insulation Ireland Ltd.** on behalf of NSAI Agrément.

Date of Issue: **August 2004**

Signed



Kevin D. Mullaney
Director of Certification, NSAI

Readers may check that the status of this Certificate has not changed by contacting NSAI Agrément , NSAI, 1 Swift Square, Northwood, Santry, Dublin 9, Ireland. Telephone: (01) 807 3800. Fax: (01) 807 3842. www.nsai.ie

Revisions:

- **April 2010** Inclusion of underfloor board.
- **January 2018** Product specification updated to reflect manufactures Declaration of Performance.
- **October 2018** Rebranding revision
- **January 2021** General revision.
- **23rd October 2026** General revision and removal of Partial Fill Cavity Wall product range.

Bibliography

[1] I.S. EN 13165:2012+A2:2016 *Thermal Insulation Products for Buildings – Factory Made Expanded Polystyrene (EPS) Products – Specification*.

[2] BS 8203:2017 *Code of Practice for Installation of Resilient Floor Coverings.*

[3] BS8215:1991 *Code of Practice for Design and Installation of Damp-proof Courses in Masonry Construction.*

[4] BS8102:2022 *Protection of Below Ground Structures Against Water Ingress. Code of Practice.*

[5] I.S. EN 1991-1-1:2002/NA:2013 *Eurocode1: Actions on Structures – Part 1-1: General Actions - Densities, Self-Weight, Imposed Loads for Buildings.*

[6] I.S. EN 13501-1:2018 *Fire Classification of Construction Products and Building Elements – Part 1: Classification Using Data From Reaction to Fire Tests.*

[7] I.S. EN 12667:2001 *Thermal Performance of Building Materials and Products – Determination of Thermal Resistance by Means of Guarded Hot Plate and Heat Flow Meter Methods – Products of High and Medium Thermal Resistance.*

[8] DoHLGH: - *Limiting Thermal Bridging & Air Infiltration – Acceptable Construction Details*