NSAI Agrément

IRISH AGRÉMENT BOARD
CERTIFICATE NO. 08/0325

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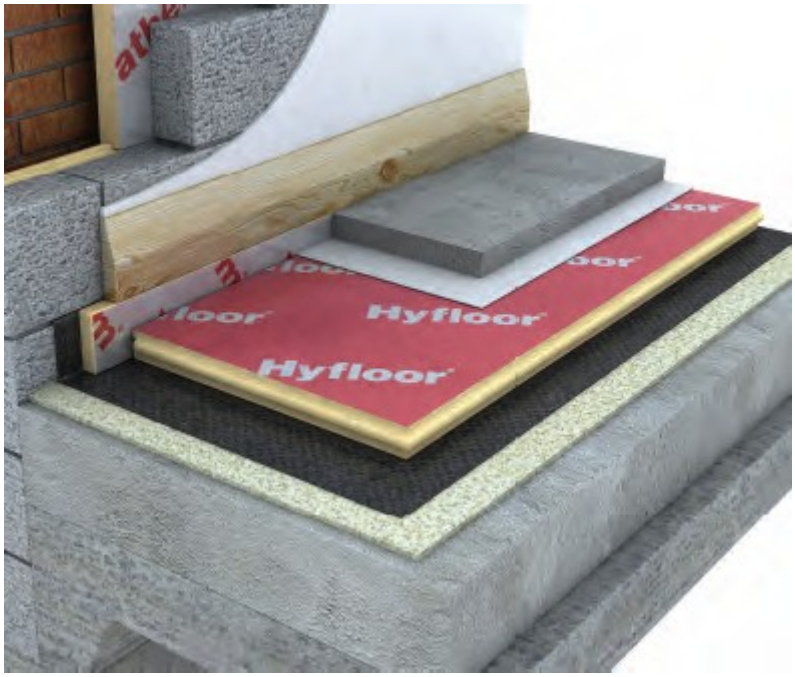
Xtratherm Hyfloor Underfloor Insulation

Isolation pour planchers en béton
Wärmedämmung für beton fußboden

NSAI Agrément (Irish Agrément Board) is designated by Government to issue 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 the **Building Regulations 1997 to 2007**.



PRODUCT DESCRIPTION:
This Certificate relates to Xtratherm Hyfloor Underfloor Insulation, a rigid polyisocyanurate modified polyurethane foam board manufactured in accordance with IS EN 13165:2001 *Thermal insulation products for buildings – Factory made rigid polyurethane foam (PUR) products – Specification* with a foil laminate facing on both sides.

This Certificate certifies compliance with the requirements of the Building Regulations 1997 to 2007.

This Certificate is a confirmation of BBA Certificate No. 07/4406 issued by the British Board of Agrément, PO Box 195, Bucknalls Lane, Garston, Watford WD25 9BA.

USE:
Xtratherm Hyfloor Underfloor Insulation is used for the thermal insulation in ground supported and suspended floors and may be installed:

- Below a concrete floor slab;
- Below a cement based floor screed on a concrete slab with a hardcore base;
- Below a wood-based floor, e.g. tongue-and-groove plywood 16mm thick (minimum or OSB 18mm thick (minimum)
- Between the joists of a suspended timber floor.

MANUFACTURE AND MARKETING:
The product is manufactured and marketed by:

Xtratherm Ltd.,
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Navan,
Co. Meath,
Ireland
Tel: +353 (0)46 90 66000
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1.1 ASSESSMENT

In the opinion of NSAI Agrément, Xtratherm Hyfloor Underfloor Insulation if used in accordance with this Certificate, meets the requirements of the Building Regulations 1997 - 2007 as indicated in Section 1.2 of this Certificate.

1.2 BUILDING REGULATIONS 1997 to 2007

REQUIREMENT:

Part D – Materials and Workmanship

D3 – Xtratherm Hyfloor Underfloor Insulation, as certified in this Certificate, is comprised of proper materials fit for their intended use (See Part 4 of this Certificate).

D1 – Xtratherm Hyfloor Underfloor Insulation, as certified in this Certificate, meets the requirements of the building regulations for workmanship.

Part A – Structure

A1 – Loading

Xtratherm Hyfloor Underfloor Insulation has adequate strength and stiffness to accept floor loads.

Part B – Fire Safety

B3 – Internal Fire Spread (Structure)

Xtratherm Hyfloor Underfloor Insulation 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

Xtratherm Hyfloor Underfloor Insulation meets the requirements of this regulation when installed in accordance with this Certificate in floors constructed in compliance with the conditions indicated in Part 3 of this Certificate.

Part L – Conservation of Fuel and Energy

L1 - Conservation of fuel and energy

Based on the measured thermal conductivity 0.023W/mK, floors incorporating Xtratherm Hyfloor Underfloor Insulation can meet current 'U-value' requirement of 0.25W/m^{2}K for ground floors (see Section 4.5 of this Certificate).

2.1 PRODUCT DESCRIPTION

Xtratherm Hyfloor Underfloor Insulation consists of a rigid polyisocyanurate modified polyurethane foam board manufactured in accordance with IS EN 13165:2001 *Thermal insulation products for buildings – Factory made rigid polyurethane foam (PUR) products – Specification* with a foil laminate facing on both sides.

Table 1 shows the Xtratherm Hyfloor Underfloor Insulation product range.

Length	2400mm
Width	1200mm
Thickness	100mm*
* Other thicknesses are available	

Table 1: Product Range

2.2 MANUFACTURE

Xtratherm Hyfloor Underfloor Insulation is manufactured from a formulation of chemicals, which is poured onto the foil laminate facers subsequently autohesively bonded to the foam core during manufacture, and then cut to the prescribed width and length.

Quality control checks include board dimensions, squareness, flatness, alignment of facers, density, compressive strength and thermal conductivity.

2.3 DELIVERY, STORAGE AND MARKING

Xtratherm Hyfloor Underfloor 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 General

Installation of Xtratherm Hyfloor Underfloor Insulation must be in accordance with the Certificate holder's instructions and the requirements of this Certificate. Consideration should be given to the recommendations of CP 102:1973 *Code of practice for protection of buildings against water from the ground*.

All concrete floor surfaces must be smooth, level and flat to within 5mm when measured with a 2m straight-edge. Irregularities greater than this must be removed. Minor irregularities (up to 10mm deep) may be levelled with mortar or thin screed.

In ground-supported concrete floors, the concrete floor slab over which the boards are laid should be left for as long as possible to maximise drying out and dissipation of constructional moisture in accordance with Section 3.1.2 of BS 8203:2001 *Code of practice for installation of resilient floor coverings*.

Where the boards are used over ground supported concrete floor slabs, a suitable damp proof membrane (dpm) in accordance with CP 102:1973 should be laid to resist moisture from the ground. Where the boards are used on hardcore bases under ground supported concrete slabs, the hardcore must be compacted and blinded with a thin layer of sand before application of the dpm and boards.

Where a screed or concrete slab is laid over the product, vertical upstands of insulation should be provided in accordance with accepted details.

In suspended timber floors, the insulation boards are installed between the floor joists.

The boards can be cut using a sharp knife or fine-toothed saw to fit around service penetrations.

2.4.2 Laying Below the Floor Slab

Where Xtratherm Hyfloor Underfloor Insulation is 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.

Xtratherm Hyfloor Underfloor Insulation should be laid using the tongue and groove jointing, and fitted tightly at the edges and around any service penetrations. Spreader boards should be used to protect the boards. Vertical upstands of insulation 25mm thick should be placed at the floor perimeter to minimise thermal bridging.

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

2.4.3 Laying Below the Floor Screed

Where Xtratherm Hyfloor Underfloor Insulation is 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 8203:2001.

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.

2.4.4 Laying in Suspended Timber Floors

Xtratherm Hyfloor 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, Xtratherm Hyfloor 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 Incorporation of Services

The maximum continuous working temperature of the boards is 100°C. De-rating of electrical cables should be considered where the insulation restricts air cooling of cables.

Where possible, electrical conduits, gas and water pipes or other services should be contained within ducts or channels within the concrete slab. Where this is not possible, the services may be accommodated within the insulation, provided they are securely fixed to the concrete slab. Electrical cables should be enclosed in a suitable conduit. With hot pipes the insulation must be cut back to maintain an air space.

Where water pipes are installed below the insulation they should be pre-lagged. Generally, insulation will be relatively thin so it would not be possible to install pipes within the insulation. Pipes installed above the insulation will not require lagging, although some provision needs to be made for expansion and contraction.

On intermediate/exposed floors all the services should be incorporated beneath the existing floor, above the insulation where possible.

On board overlay floors, in situations where access to the services is desirable, a duct may be formed by mechanically fixing to the floor timber bearers of the same thickness as the insulation to provide support for a particle board cover. Services should be suitably fixed to the floor base and not to the insulation boards.

Figure 1: Xtratherm Hyfloor Underfloor Insulation installed below the floor screed

3.1 GENERAL

Xtratherm Hyfloor Underfloor Insulation, when installed in accordance with this Certificate, is effective in reducing the 'U' value (thermal transmittance) of new and existing floor constructions.

Ground supported floors incorporating Xtratherm Hyfloor Underfloor Insulation must include a suitable damp proof membrane laid in accordance with CP 102:1973.

Suspended concrete ground floors incorporating Xtratherm Hyfloor Underfloor Insulation must include suitable ventilation and void should remain inaccessible.

3.2 FLOOR LOADING

The design loadings for self contained single family dwelling units as defined in BS 6399-1:1996 *Loading for buildings – code of practice for dead and imposed loads*, are:

- Uniformly distributed load 1.5 kPa
- Concentrated load 1.4 kN

Xtratherm Hyfloor Underfloor Insulation supported by chipboard or OSB laid over joists or a screed can support these design loadings without undue deflection.

Where Xtratherm Hyfloor Underfloor Insulation is 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 PIR is 100^{o}C. Xtratherm Hyfloor Underloor Insulation is suitable for use with underfloor heating systems.

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.

4.1 BEHAVIOUR IN FIRE

Combustibility - Although Xtratherm Hyfloor Underfloor Insulation is not classified as non-combustible, when used in the context of this Certificate the increase in fire load in the building consequent to its use, is negligible. The boards when in proximity to a constructional hearth must be protected by 250mm of solid concrete or as detailed in Diagram 4 of TGD J: Heat Producing Appliances.

Toxicity – Negligible when used in a ground floor construction.

4.2 STRENGTH

Xtratherm Hyfloor Underfloor Insulation when installed in accordance with the manufacturer's instructions, and this Certificate, will resist the loads likely to be met during installation and in service.

4.3 RESISTANCE TO MOISTURE

Xtratherm Hyfloor Underfloor Insulation will not allow moisture to cross the floor construction provided it is installed in accordance with this Certificate.

4.4 CONDENSATION RISK

Xtratherm Hyfloor Underfloor Insulation has a water vapour resistance greater than 100MNs/g when tested in accordance with BS 4370-2:1993 *Methods of test for rigid cellular materials – Methods 7 to 9*. It has significant resistance to the passage of water vapour when used in ground floor construction using a suitable damp proof membrane.

Capillary Action – The closed cell structure does not allow water uptake by capillary action.

4.5 THERMAL INSULATION

The aged thermal conductivity 'λ' value of Xtratherm Hyfloor Underfloor Insulation, when measured in accordance with IS EN 12667:2001, is 0.023W/mK.

The required maximum U-value of 0.25W/m^{2}K for ground floors can be obtained with Xtratherm Hyfloor Underfloor Insulation constructions as indicated in Table 2.

The DoEHLG publication *Limiting Thermal Bridging & Air Infiltration – Acceptable Construction Details* gives guidance on limiting cold bridging and should be referred to.

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

- Density
- Water vapour transmission
- Long term water absorption
- Dimensional accuracy
- Compressive and cross breaking strength
- Dimensional stability
- Thermal conductivity
- Efficiency of the construction process

4.7 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.

		Insulation board thickness (mm)			
Floor type	**P/A**	**25**	**50**	**75**	**100**
Insulation below solid concrete slab	0.2	0.24	0.19	0.15	0.13
	0.4	0.35	0.25	0.19	0.16
	0.6	0.41	0.28	0.21	0.17
	0.8	0.45	0.30	0.23	0.18
	1.0	0.47	0.31	0.23	0.19
Insulation between joists of suspended timber floor	0.2	0.29	0.24	0.20	0.18
	0.4	0.39	0.30	0.24	0.21
	0.6	0.44	0.32	0.26	0.22
	0.8	0.48	0.34	0.27	0.23
	1.0	0.50	0.36	0.28	0.23

P/A = Perimeter/Area

U-values in pale squares comply with Building Regulations requirement of maximum U-value of 0.25W/m^{2}K for ground floors

Table 2: Ground Floor Construction Typical U Values

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 1997 to 2007 and 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.

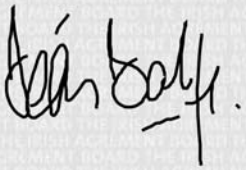
5.7 Where reference is made in this Certificate to any Act of the Oireachtas, Regulation made thereunder, Statutory Instrument, Code of Practice, National Standards, manufacturer's instructions, or similar publication, it shall be construed as reference to such publication in the form in which it is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

NSAI Agrément

This Certificate No. **08/0325** is accordingly granted by the NSAI to **Xtratherm Ltd.** on behalf of NSAI Agrément.

Date of Issue: **October 2008**

Signed



Seán Balfe
Director of NSAI Agrément

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