Xtratherm Thin-R Underfloor Board (XT/UF Grade)

PRODUCT DESCRIPTION:
This Detail Sheet relates to Xtratherm Thin-R Underfloor Board, as defined in NSAI Agrément Certificate 03/0183. Xtratherm Thin-R Underfloor Board uses Polyisocyanurate (Polyiso), a thermoset closed cell rigid foam insulation manufactured in accordance with IS EN 13165:2008 *Thermal insulation products for buildings – Factory made rigid polyurethane foam (PUR) products – Specification*, having regard to the description of Polyisocyanurate (PIR) in paragraph 1 of the scope of the standard. During the manufacturing process, liquid raw materials expanded by blowing agents are applied between trilaminate aluminium foil facings.

USE:
The product 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 screed on a concrete slab with a hardcore base;
- Below a suitable OSB plywood or shipboard covering on a solid floor;
- Above a suspended concrete floor (e.g. block and beam) with a cement based screed;
- Between the joists of a suspended timber ground floor.

Part One / Certification 1

1.1 ASSESSMENT
In the opinion of NSAI Agrément, Xtratherm Thin-R Underfloor Board if used in accordance with this Detail Sheet, meets the requirements of the Building Regulations 1997 - 2008 as indicated in Section 1.2 of Certificate 03/0183.

1.2 BUILDING REGULATIONS 1997 to 2008
This matter is dealt with in NSAI Agrément Certificate 03/0183.

2.1 PRODUCT DESCRIPTION

Xtratherm Thin-R Underfloor Board consists of a rigid Polyiso foam core with low emissivity trilaminate aluminium foil facings both sides. The boards are plain edged on all four sides. The system is an efficient layer to reduce thermal transmittance of ground supported and suspended concrete floors. Xtratherm Thin-R Underfloor Board can also be used in suspended timber floors between the joists providing a high level of thermal insulation in floors. Manufactured to IS EN 13165:2008 and tested to ensure compliance with the requirements for compressive strength, water vapour transmission, thermal conductivity, thermal resistance and dimensional stability.

Xtratherm Thin-R Underfloor Boards are placed below the slab or between the slab and the screed. Vertical upstands of insulation should be used to separate the screed/slab from the wall to reduce thermal bridging at the wall/floor junction. The XT/UF board does not contain either CFC or HCFC gases and has zero Ozone Depletion Potential.

Table 1 shows the Xtratherm Thin-R Underfloor Board product range.

Length	2400mm
Width	1200mm
Thickness	25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 90, 100, 110, 120, 140, 150, 165, 180mm
Grade	PIR
Other sizes are available subject to quantity	

Table 1: Product Range

2.2 INSTALLATION

2.2.1 Laying Below the Floor Slab

Where Xtratherm Thin-R Underfloor Board is used below the floor slab, lay the hardcore in layers, min 150 – 225mm. Each layer should be well compacted, with the surface blinded with quarry dust or sand to provide a suitable surface for laying a damp proof membrane (dpm).

A dpm, e.g. 1200 gauge polythene or a radon barrier, subject to site conditions, 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 Thin-R Underfloor Board should be laid with closely butted joints, laid staggered with 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 to minimise thermal bridging (see Figure 1).

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

2.2.2 Laying Below the Floor Screed

Where Xtratherm Thin-R Underfloor Board 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 *Code of practice for the installation of resilient floor coverings*.

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.

2.2.3 Laying on Precast Block and Beam Floor

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

Xtratherm Thin-R Underfloor Board should be laid with joints tightly butted. During construction the Xtratherm Thin-R Underfloor Boards must be protected from damage by moisture sources, water spillage and plaster droppings. Use scaffold boards to prevent wheelbarrow and other traffic damage to the boards. Xtratherm Thin-R Underfloor Boards should be over laid with 500 gauge polythene sheet 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 detail to avoid thermal bridging.

All surfaces should be level to accept the Xtratherm Thin-R Underfloor Boards. Uneven surfaces should be levelled prior to laying of the floor.

2.2.4 Laying Between the Joists of a Suspended Timber Floor

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

Where services need to be accommodated below the floor, Xtratherm Thin-R Underfloor Board 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.

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

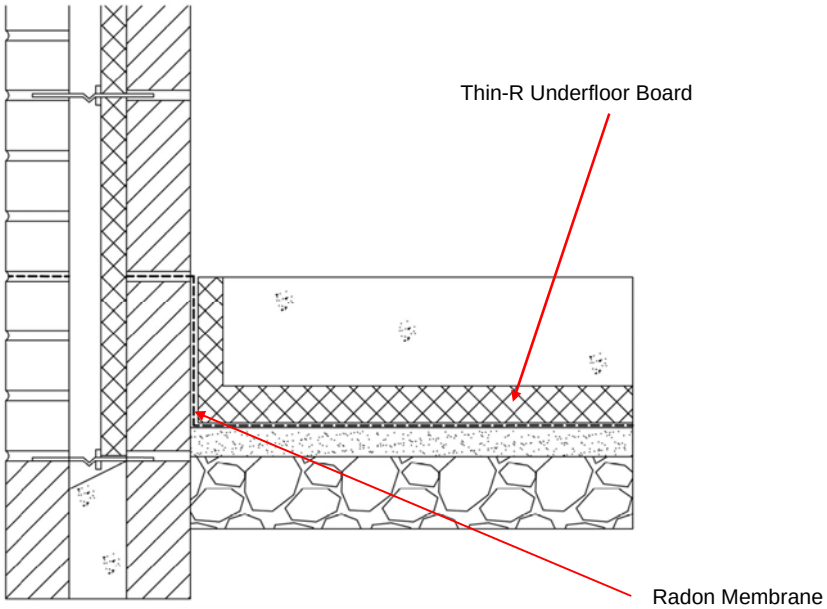

Figure 1: Solid Floor Detail with Radon Membrane

Part Three / Design Data 3

3.1 GENERAL
Xtratherm Thin-R Underfloor Board when installed in accordance with this Detail Sheet, is effective in reducing the U-value (thermal transmittance) or new and existing floor constructions.

Ground support floors incorporating Xtratherm Thin-R Underfloor Board must include a suitable damp proof membrane laid in accordance with CP 102:1973. Suspended concrete ground floors incorporating Xtratherm Thin-R Underfloor Board must include suitable ventilation (see Figure 2) and void should remain inaccessible.

The overlay to Xtratherm Thin-R Underfloor Board should be either:

- Cement based floor.
- Concrete slab.
- OSB board, plywood or chipboard to a thickness of 18mm for domestic purposes and 22mm for other on any floating floor.
- Flooring grade chipboard, ply or softwood timber, when insulation is placed between joists on suspended timber floor'

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 1.5kPa
- Concentrated load 1.4kN

Xtratherm Thin-R Underfloor Board covered with chipboard, OSB or similar material or a screed can support these design loadings without undue deflection.

Where Xtratherm Thin-R Underfloor Board is used under a concrete slab, resistance to concentrated and distributed loads is a function of the slab specification.

3.3 UNDERFLOOR SERVICES
The maximum continuous working temperature of PIR is 100^{o}C. Xtratherm Thin-R Underfloor Board 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 water proof finish (e.g. vinyl) must be provided to protect it.

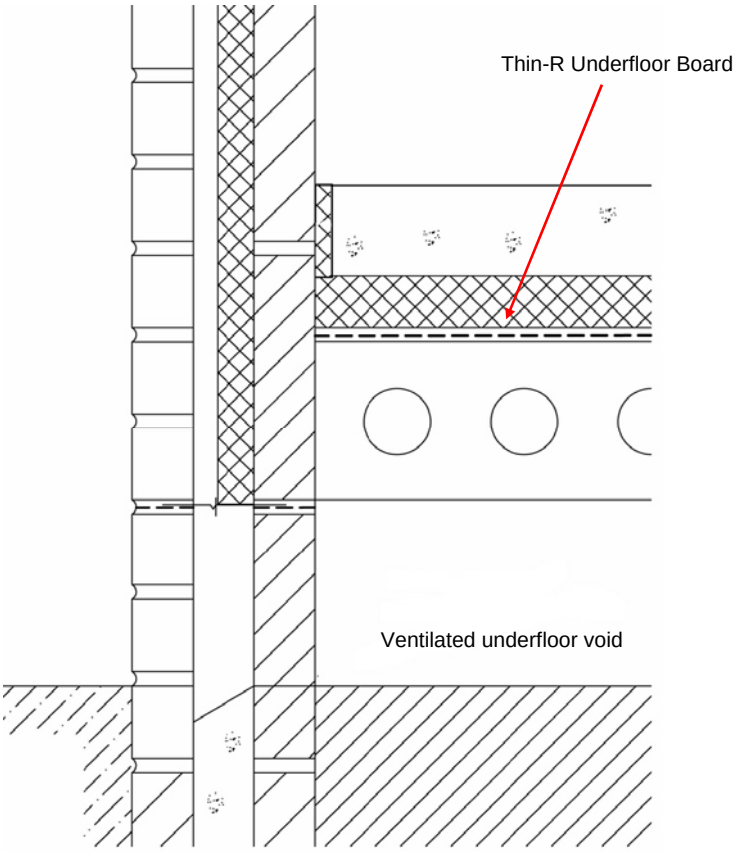

Figure 2: Suspended Concrete Ground Floor Detail

Part Four / Technical Investigations 4

4.1 BEHAVIOUR IN FIRE

Combustibility - Although Xtratherm Thin-R Underfloor Board is not classified as non-combustible, when used in the context of this Detail Sheet 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 to Part J of the Building Regulations 1997 to 2008.

Toxicity – Negligible when used in a ground floor construction.

As Xtratherm Thin-R Underfloor Board XT/UF is manufactured without the use ofCFC or HCFC gases, there is no release of such gas on burning.

4.2 STRENGTH

Xtratherm Thin-R Underfloor Board when installed in accordance with the manufacturer's instructions, and this Detail Sheet, will resist the loads likely to be met during installation and in service.

4.3 RESISTANCE TO MOISTURE

Xtratherm Thin-R Underfloor Board will not allow moisture to cross the floor construction provided it is installed in accordance with this Detail Sheet.

4.4 CONDENSATION RISK

Xtratherm Thin-R Underfloor Board has a vapour resistivity exceeding 100MNs/g. 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 '$\lambda_{90/90}$' value of Xtratherm Thin-R Underfloor Board, when measured in accordance with IS EN 12667:2001, and calculated in accordance with Annex C of IS EN 13165:2008 is 0.022W/mK. The required maximum U-values for ground floors can be obtained with Xtratherm Thin-R Underfloor Board constructions as indicated in Table 3. The DoEHLG publication *Limiting Thermal Bridging & Air Infiltration – Acceptable Construction Details* gives guidance on limiting cold bridging and should be referred to.

4.6 DURABILITY

Xtratherm Thin-R Underfloor Boards are rot proof and durable. As floor insulation, Xtratherm Thin-R Underfloor Board is 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 this Detail Sheet.

Property	Declared Value	Test Method
Long Term Water Absorption by Immersion	WL(T)2	EN 12087
Dimensional Stability	DS(TH)6	EN 1604
Density	32 kg/m^3	EN 1602
Compressive Stress	> 140 kPa	EN 826
Thermal Conductivity	0.022 W/mK	EN 12667
Thermal Resistance		
- 35 mm	1.60 m^2K/W	
- 40 mm	1.83 m^2K/W	
- 50 mm	2.28 m^2K/W	
- 60 mm	2.74 m^2K/W	
- 65 mm	2.97 m^2K/W	
- 70 mm	3.20 m^2K/W	
- 80 mm	3.65 m^2K/W	
- 90 mm	4.11 m^2K/W	
- 100 mm	4.57 m^2K/W	
- 110 mm	5.02 m^2K/W	
- 120 mm	5.48 m^2K/W	
- 130 mm	5.94 m^2K/W	
- 140 mm	6.39 m^2K/W	
- 150 mm	6.85 m^2K/W	
- 165 mm	7.53 m^2K/W	
- 180 mm	8.22 m^2K/W	

Table 2: Physical Properties of Xtratherm Thin-R Underfloor Board

P/A*	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
XT/UF (mm)	35	50	56	63	65	67	69	71	72

*Perimeter/Area

Table 3: Ground Floor Constructions to achieve 0.25W/m^2K U value