NSAI Agrément

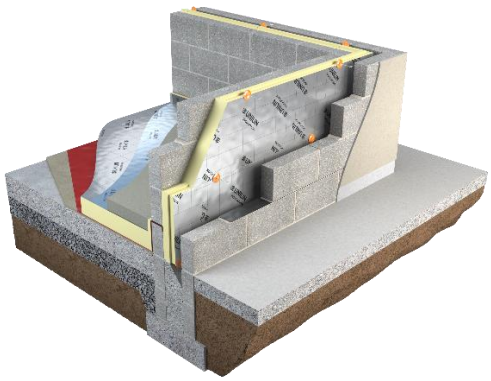
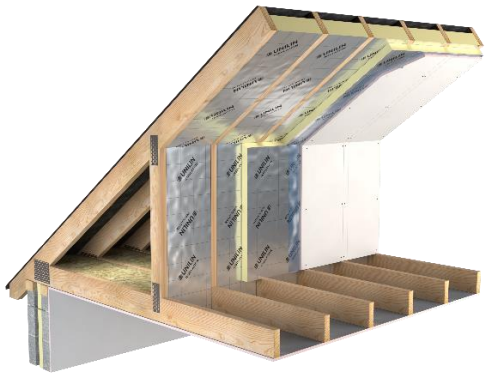
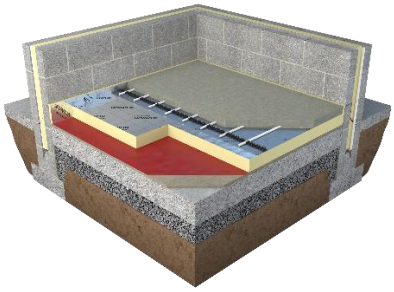
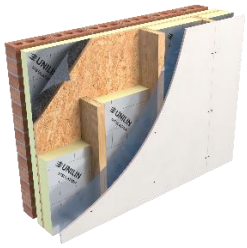
IRISH AGRÉMENT BOARD
CERTIFICATE NO. 03/0183

Unilin Insulation Ireland Ltd Kells Road,
Navan, Co. Meath, Ireland.
Tel: +353 (46) 90 66050
Email: tech.ui@unilin.com
W: www.unilininsulation.ie

Unilin Thin-R 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 Irish **Building Regulations 1997 to 2024.**


PRODUCT DESCRIPTION:
This Certificate relates to the following products:

- Unilin Thin-R Partial Fill Cavity Wall Board – XT/CW Grade (Detail Sheet 1)
- Unilin Thin-R Pitched Roof Board – XT/PR_UF Grade (Detail Sheet 2)
- Unilin Thin-R Underfloor Board – XT/PR_UF Grade (Detail Sheet 3)
- Unilin Thin-R Thermal Liner Insulated Drylining Board – XT/TL Grade (Detail Sheet 4)
- Unilin Thin-R Timber Frame Board – XT/TF Grade (Detail Sheet 5)

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

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

Unilin Ltd.,
Kells Road,
Navan,
Co. Meath,
Ireland
Email: tech.ui@unilin.com
W: www.unilininsulation.ie

Readers are advised to check that this Certificate has not been withdrawn or superseded by a later issue by contacting NSAI Agrément, NSAI, Santry, Dublin 9 or online at http://www.nsai.ie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 Unilin insulation products described in this Certificate, if used in accordance with this Certificate, meet the requirements of the following clauses of the Irish Building Regulations 1997 to 2024, hereafter referred to as the Building Regulations in this Certificate:

Part D – Materials and Workmanship

D3 – The Unilin 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 Unilin insulation products, as certified in this Certificate, meet the requirements of the Irish building regulations for workmanship.

Part A – Structure

A1 – Loading

Unilin Thin-R Underfloor Board has adequate strength and stiffness to accept floor loads (see Part 3 of the relevant Detail Sheet).

Part B – Fire Safety

B2 – Internal Fire Spread (Linings)

The plasterboard side of Unilin Thin-R Thermal Liner Insulated Drylining Board is considered to be Euroclass Class B-s1, d0. It may therefore be used on the internal surfaces of buildings of every purpose group.

B3 – Internal Fire Spread (Structure)

Walls using the Unilin insulation products as certified in this Certificate, meet the requirement, provided the completed walls comply with the conditions described in Section 4.1 of Detail Sheet 1.

Unilin Thin-R Underfloor Board 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.

Unilin Thin-R Thermal Liner Insulated Drylining Board when installed with a residual cavity between the board and the wall or ceiling, will require the provision of cavity barriers (see Part 4 of the relevant Detail Sheet) and may be used in buildings of every purpose group.

B4 – External Fire Spread

Unilin Thin-R Pitched Roof Board will not affect the external fire rating of the roof in which it is incorporated.

Part C – Site Preparation and Resistance to Moisture

C4 – Resistance to Weather and Ground Moisture

The Unilin insulation products described in this Certificate, when installed in compliance with the conditions indicated in Part 3 of the relevant Detail Sheet, will not promote the passage of moisture and will minimise the risk of surface or interstitial condensation.

Part F – Ventilation

F2 – Condensation in Roofs

Unilin Thin-R Pitched Roof Board meets the requirements of the Irish Building Regulations, when designed and installed in accordance with Part 2 and Part 3 of Detail Sheet 3.

Part J – Heat Producing Appliances

J3 – Protection of Building

The Unilin insulation products, if used in accordance with the relevant Detail Sheets, meet the requirements of the Irish Building Regulations.

Part L – Conservation of Fuel and Energy

L1 - Conservation of fuel and energy

Based on the measured thermal conductivity of the Unilin insulation products described in this Certificate, walls, floor and roofs can meet current U-value requirements (see Part 4 of the relevant Detail Sheet).

Part Two / Technical Specification and Control Data 2

2.1 PRODUCT DESCRIPTION
Each of the Unilin insulation products is given a detailed description in the relevant Detail Sheet.

2.2 MANUFACTURE
The Unilin insulation products described in this Certificate are manufactured from a formulation of chemicals, which is poured onto the 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
Unilin 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 and should be stored under cover in their original wrapping. 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.

Part Three / Design Data 3

3. GENERAL
This matter is dealt with for each product in the relevant Detail Sheet.

Part Four / Technical Investigations 4

4.1 BEHAVIOUR IN FIRE
Each Detail Sheet contains the relevant information.

4.2 WATER VAPOUR PENETRATION AND CONDENSATION RISK
Each Detail Sheet contains the relevant information.

4.3 THERMAL INSULATION
Each Detail Sheet contains the relevant information.

4.4 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

4.5 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.

Public

Part Five / Conditions of Certification 5

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 Irish Building Regulations 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.

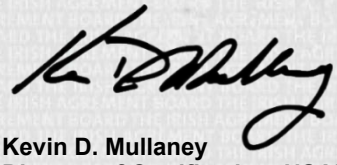
5.7 Where reference is made in this Certificate to any Act of the Oireachtas, Regulation made thereunder, Statutory Instrument, Code of Practice, National Standards, manufacturer's instructions, or similar publication, it shall be construed as reference to such publication in the form in which it is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

NSAI Agrément

This Certificate No. **03/0183** is accordingly granted by the NSAI to **Unilin Ltd.** on behalf of NSAI Agrément.

Date of Issue: **July 2003**

Signed



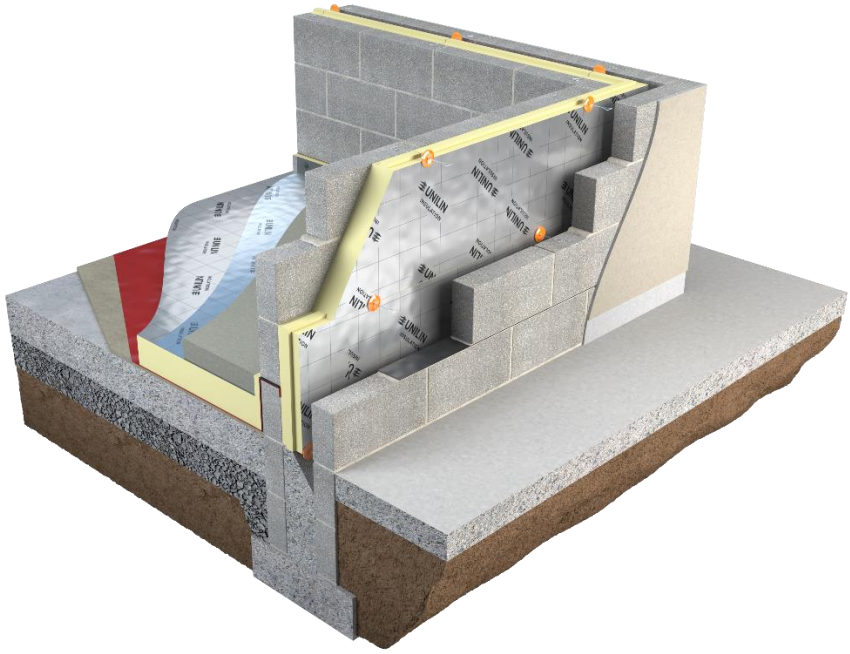
Kevin D. Mullaney
Director of Certification, NSAI

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 4 Thin-R insulation products.
January 2018: Product specification updated to reflect manufactures Declaration of Performance.
13th January 2021: General revision.
19th November 2023: Company rebranding.
19th October 2026: Revision to Detail Sheet 1 and Detail Sheet 3

Public

Unilin Thin-R Partial Fill Cavity Wall Board (XT/CW Grade)



PRODUCT DESCRIPTION
This Detail Sheet relates to Unilin Thin-R Partial Fill Cavity Wall Board, as defined in NSAI Agrément Certificate 03/0183. Unilin Thin-R Partial Fill Cavity Wall Board has square, T&G or rebated edges, and uses Polyisocyanurate (Polyiso), a thermoset closed cell rigid foam insulation manufactured in accordance with I.S. EN 13165:2012+A2:2016, *Thermal insulation products for buildings – Factory made rigid polyurethane foam (PU) 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 of masonry walls up to 25m in height, subject to the separate conditions applying to walls up to 12m and walls over 12m in height contained in Section 3.6 of this Detail Sheet. It also facilitates the control of surface and interstitial condensation in walls.

Part One / Certification 1

1.1 ASSESSMENT
In the opinion of NSAI Agrément, Unilin Thin-R Partial Fill Cavity Wall Board, if used in accordance with this Detail Sheet, meets 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 Certificate 03/0183.

1.2 BUILDING REGULATIONS 1997 to 2024
This matter is dealt with in NSAI Agrément Certificate 03/0183.

Public

2.1 PRODUCT DESCRIPTION

Unilin Thin-R Partial Fill Cavity Wall Board consists of a rigid Polyiso core with low emissivity trilaminate aluminium foil facings both sides. The system is used with certified stainless steel wall ties designed to I.S. EN 845-1:2013+A1:2016, *Specification for ancillary components for masonry - Part 1: Wall ties, tension straps, hangers and brackets*. Each tie has a plastic retaining clip to ensure they are held against the outer surface of the inner leaf during installation. Other NSAI Agrément approved wall ties may also be used with the system. The XT/CW board does not contain either CFC or HCFC gases and has zero Ozone Depletion Potential. Table 1 shows the Unilin Thin-R Partial Fill Cavity Wall Board product range.

Length	1200mm
Width	450, 600mm
Thickness	40, 50, 60, 70, 80, 90, 100, 120mm
Grade	PIR
Other sizes are available subject to quantity	

Table 1: Product Range

2.2 INSTALLATION

A section of the leading leaf is built with the first row of ties at not greater than 600mm horizontal centres. This first row of insulation boards should be commenced one block below DPC level to provide improved edge insulation for the floor, as required by TGD to Part L of the Irish Building Regulations. It is recommended that the wall ties are not placed directly on the DPC. The mortar fill below DPC level must be considered, and it is also necessary to ensure that any installed radon barrier is not damaged. The walls are constructed by raising each section of the leading leaf securing the Unilin Thin-R Partial Fill Cavity Wall Board tight against the cavity face of the inner leaf with adjustable retaining clips on the wall ties. This ensures maximum thermal performance. Figure 1 shows a cavity wall section detail with Unilin Thin-R Partial Fill Cavity Wall Board. It is recommended that drainage holes be provided in the perpend block joints below DPC level at approximately 1m centres.

Wall tie spacings are not to exceed 900mm horizontally and 450mm vertically. Each board should be secured by a minimum of 3 retaining clips. Additional wall ties at unbonded openings should be located at maximum 225mm vertical centres and within 150mm of the opening. All wall ties should be installed correctly, clear of all mortar and sloped downwards towards the outer leaf and conform to structural design requirements. In severe exposure zones, Unilin Thin-R Partial Fill Cavity Wall Board should be installed in walls whilst maintaining a 40mm cavity width. Only certified wall ties should be used in conjunction with this system.

Table 2 shows typical wall tie spacing.

Cavity Width	Horizontal Spacing mm	Vertical Spacing mm	No. of Wall Ties per m^2
76 – 110	750	450	3.0
111 - 150	450	450	4.9

Table 2: Maximum Spacing of Wall Ties

Successive sections of wall fixed by certified stainless steel wall ties are constructed and Unilin Thin-R Partial Fill Cavity Wall Boards are installed as work proceeds up to the required height. Excess mortar should be removed and mortar droppings cleaned from the exposed edges of the installed boards. Use of a cavity board or similar means is recommended to protect installed boards and keep the cavity mortar free. Penetration of damp across the cavity will be prevented with good practice. An option at vertical internal and external corners is to use Unilin Thin-R Partial Fill Cavity Wall Board corner panels and engage with wall boards to ensure a complete corner seal.

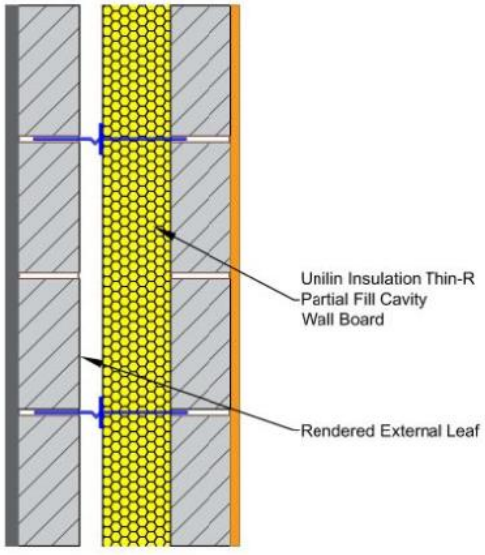


Figure 1: Unilin Cavity Wall Section

Proprietary reveal closers should be used to close cavities at openings. Where the use of wall ties is inappropriate, e.g. under window sills, use XT/Hyclips to hold the cavity boards tightly in place. Jamb details must incorporate a vertical DPC, positioned between the Unilin Thin-R Partial Fill Cavity Wall Board and the external leaf, returning a minimum of 150mm.

On-site trimming of boards where necessary to maintain continuity of insulation around doors, windows or other opes is easily executed using a fine tooth saw or builder's knife. Details of installation at junctions and around openings should be in accordance with the DoHLGH publication *Limiting Thermal Bridging & Air Infiltration – Acceptable Construction Details.*

To prevent damp penetrating across the cavity it is important to ensure the following:

- Mortar filling of cavity at wall base is not too high.
- Keep wall ties clean, free from mortar droppings. This is achieved with the use of cavity board and daily cleaning of wall ties.
- The DPC should not project into cavity at ground floor level as it can lead to catching mortar droppings, resulting in bridging the cavity.
- Avoid the build up of mortar on trays/lintels and over heads.
- Ensure the correct fitting of ties. Avoid sloping wall ties which could be caused by the difference in level between the outer and inner leaf of the cavity wall.
- Unilin Thin-R Partial Fill Cavity Wall Board is placed against the inner leaf properly, i.e. as specified in this Certificate and the manufacturer's instructions.
- Once the Unilin Thin-R Partial Fill Cavity Wall Board is installed in the cavity wall, ensure that there are no gaps in the insulation, as this will reduce the risk of cold bridging.

Good workmanship and appropriate site procedures are necessary to achieve expected thermal and air tightness performance.

Part Three / Design Data 3

3. GENERAL

3.1 Unilin Thin-R Partial Fill Cavity Wall Board, when installed in accordance with this Detail Sheet, is effective in reducing the U-value (thermal transmittance) of new external masonry cavity walls, using clay or calcium silicate bricks, concrete blocks, or natural and reconstituted stone blocks. It is essential that such walls are designed and constructed to prevent moisture penetration having regard to the Driving Rain Index.

3.2 Buildings subject to the relevant requirements of the Irish Building Regulations should be constructed from masonry units designed in accordance with I.S. EN 1996-1-1:2005+A1:2012, *Eurocode 6 - Design of masonry structures - Part 1-1: General rules for reinforced and unreinforced masonry structures,* I.S. EN 1996-2:2006+NA:2010, *Design of masonry structures - Part 2: Design considerations, selection of materials and execution of masonry (Including Irish National Annex)* and S.R. 325:2013+A1:2014 *Recommendations for the design of masonry structures in Ireland to Eurocode 6*.

3.3 The use of a cavity board during construction is recommended to prevent accumulation of mortar droppings on the top edge of the Unilin Thin-R Partial Fill Cavity Wall Board and to prevent bridging of cavity by mortar droppings.

3.4 As with all cavity wall insulation, the construction detailing should comply with good practice.

3.5 It is recommended that installation be carried out to the highest level on each wall. Where appropriate the top edge of the insulation should be protected by a cavity tray. On site trimming of boards may be necessary to achieve this.

3.6 Where a nominal residual cavity width of 40mm is maintained, Unilin Thin-R Partial Fill Cavity Wall Board is suitable for use in any exposure conditions, in buildings up to 12m in height. For buildings over 12m and up to 25m in height, the exposure factor must not exceed 122, calculated in accordance with BS 5618:1996 *Code of practice for thermal insulation of cavity walls* (with masonry or concrete inner and outer leaves) and using the Irish Map of Driving Rain Index. It is important to ensure during installation that:

a) Wall ties and fixings are installed correctly and are thoroughly clean.
b) Excess mortar is cleaned from the inside face of the leading leaf and any debris is removed from the cavity.
c) Mortar droppings are cleaned from the exposed edges of installed slabs.

3.7 Data obtained by NSAI Agrément confirms that a masonry wall incorporating the Unilin Thin-R Partial Fill Cavity Wall Board and built to the requirements of I.S. EN 1996-2:2006 and S.R. 325:2013+A1:2014, will not transmit water to the inner leaf.

3.8 Data obtained by NSAI Agrément also demonstrates that Unilin Thin-R Partial Fill Cavity Wall Boards do not absorb water by capillary action. When the product is used in situations where it bridges the DPC in walls, dampness from the ground will not pass through, provided the cavity is taken down to at least 150mm below the level of the lowest DPC.

3.9 A minimum cavity width of 40mm should be maintained where possible. Where, for structural reasons, the cavity width is reduced by the intrusion of ring beams or other structural elements, the manufacturer's advice on fixing and weatherproofing should be sought. Raked or recessed mortar joints must be avoided in high exposure areas.

3.10 The manufacturer has taken the responsibility of CE marking the products in accordance with harmonised standard I.S. EN 13165:2012+A2:2016, *Thermal insulation products for buildings - Factory made rigid polyurethane foam (PU) products - Specification*. An asterisk (*) appearing in this Certificate indicates that data shown is given in the manufacturer's Declaration of Performance.

Public

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

Part Four / Technical Investigations 4

4.1 BEHAVIOUR IN FIRE

Unilin Thin-R Partial Fill Cavity Wall Board may be used in buildings of any purpose group in a wall in which the cavity intercommunicates with another such cavity, and may be unlimited in extent in respect of the provision of barriers provided the walls comply with either Part B3, Diagram 17 (Cavity walls excluded from provisions for cavity barriers) of the TGD to Part B of the Irish Building Regulations or Diagram 12 of TGD to Part B Volume 2 of the Irish Building Regulations as follows:

a) The wall consists of two leaves, each being not less than 75mm thick and constructed of non-combustible materials.

b) The cavity does not exceed 150mm in width and is closed by a cavity barrier at the top of the wall and at the top of any opening through any leaf of the wall, and

c) There is no combustible material exposed or situated within the cavity other than:
   - timber lintels, window or door frames or the end faces of joists
   - pipes, ducts or cables
   - closers, flashings, DPCs or wall ties
   - thermal insulating material
   - meter boxes which require an opening in the outer leaf of not greater than 800 x 500mm and do not penetrate the inner leaf except through a sleeve of not more than 80 x 80mm which is fire stopped where it passes through the inner leaf.

Combustibility –Unilin Thin-R Partial Fill Cavity Wall has a reaction to fire classification of NPD to IS EN 13501-1. The boards are combustible and must be protected from naked flames and other ignition sources during and after installation.

Spread of flame within the cavity – In an unventilated cavity the amount of air will be insufficient to support combustion and flame spread is unlikely to occur.

Toxicity – Negligible when used in a cavity wall situation.

As Unilin Thin-R Partial Fill Cavity Wall Board XT/CW without CFC or HCFC gases, there is no release of such gas on burning.

4.1.1 J3 – Protection of Building

Combustible wall insulation material shall generally 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. Particular details are given TGD Part J of the Irish Building regulations. It should also be separated by 40mm from the external surface of a masonry chimney. For chimneys covered by I.S. EN 1856-1:2009 *Chimneys - Requirements for metal chimneys - Part 1: System chimney products* separation between this product and the external surface of the chimney shall be determined in accordance with TGD to Part J of the Irish Building Regulations.

4.2 WATER PENETRATION

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

Unilin Thin-R Partial Fill Cavity Wall Board, when used in accordance with this Detail Sheet, presents no significant risk of water penetration.

4.3 WATER VAPOUR PENETRATION AND INTERSTITIAL CONDENSATION RISK

Unilin Insulation XT/CW T&G has a water vapour resistance greater then 100MNs/g. It has significant resistance to the passage of water vapour when used in conventional masonry wall construction. This combined with the interlocking T&G profiling of the board obviates the risk of surface condensation and presents no significant risk of damage from interstitial condensation.

Water vapour transmission properties of Unilin Thin-R Partial Fill Cavity Wall Boards including facings have be determined in accordance with I.S. EN 12086 and water vapour diffusion resistance factors (μ) for various non-homogeneous insulation thicknesses can be requested from the manufacture.

In general, when insulating a building, the recommendations of BS 5250:2021 *Code of practice for control of condensation in buildings* should be followed to minimise the risk of both interstitial condensation and surface condensation within the building elements and structures.

When building elements do not follow the principles of BS 5250:2021, a robust hygrothermal assessment to either I.S. EN 15026:2007 Hygrothermal performance of building components and building elements - Assessment of moisture transfer by numerical simulation or I.S. EN ISO 13788:2012 Hygrothermal performance of building components and building elements - Internal surface temperature to avoid critical surface humidity and interstitial condensation - Calculation methods must be considered.

Public

Property	Declared Value	Test Method
Reaction to Fire	NPD*	EN 13501
Dimensional Stability	DS(70,90)4*	EN 1604
Density	32 kg/m^3	EN 1602
Compressive Strength	CS (10/Y) 120*	EN 826
Thermal Conductivity	0.022* W/mK	EN 12667
Thermal Resistance - 35 mm - 40 mm - 50 mm - 60 mm - 65 mm - 70 mm - 80 mm - 90 mm - 100 mm - 110 mm - 120 mm	 1.60 m^{2}K/W 1.83 m^{2}K/W 2.28 m^{2}K/W 2.74 m^{2}K/W 2.97 m^{2}K/W 3.20 m^{2}K/W 3.65 m^{2}K/W 4.11 m^{2}K/W 4.57 m^{2}K/W 5.02 m^{2}K/W 5.48 m^{2}K/W	

Table 3: Physical Properties of Unilin Thin-R Partial Fill Cavity Wall Board

Board Thickness	Cavity Wall, Dense Block/Brick
80 mm	0.22 W/m^{2}K
90 mm	0.20 W/m^{2}K
100 mm	0.18 W/m^{2}K

Table 4: Wall Constructions – Typical U-values

4.4 SURFACE CONDENSATION

Unilin Thin-R Partial Fill Cavity Wall Boards have sufficient thermal resistance to contribute to the elimination of risk of surface condensation. At thermal bridged junctions, the guidance within the DoHLGH publication Limiting Thermal Bridging & Air Infiltration – Acceptable Construction Details (ACD) should be adhered to. Alternatively designed should engage the services of a registered NSAI Thermal Modeller to carry out an assessment of bridged junctions which are outside of the junctions covered by the ACD's.

4.5 THERMAL INSULATION

The aged thermal conductivity '$\lambda_{90/90}$' value of the Unilin Thin-R product range, when measured in accordance with IS EN 12667:2001, and calculated in accordance with Annex C of I.S. EN 13165:2012 is 0.022* W/m.K.

The foil face has a low emissivity value of 0.05. Air cavities adjacent to surfaces with a low emissivity will have increased thermal resistance which will in turn reduce heat loss. The U-value of a wall construction will depend on the cavity width, the thickness of insulation and the thermal conductivity and thickness of all other building materials used in the make-up of the wall.

The Unilin Thin-R products can maintain or contribute to maintaining continuity of thermal insulation at junctions between elements and openings. Guidance in this respect, and on limiting heat loss by air infiltration, can be found in the DoHLGH publication *Limiting Thermal Bridging & Air Infiltration – Acceptable Construction Details*.

4.6 MATERIALS IN CONTACT WITH ELECTRICAL WIRING

Electrical installations should be in accordance with I.S. 10101. It is recommended that cables should not be buried in the insulation and carried in a conduit. In relation to recessed spotlights and other luminaries, IS10101 requires they be not less than the minimum distances from combustible materials as specified in clause 422.4.2 of the National rules for the Electrical Installation.

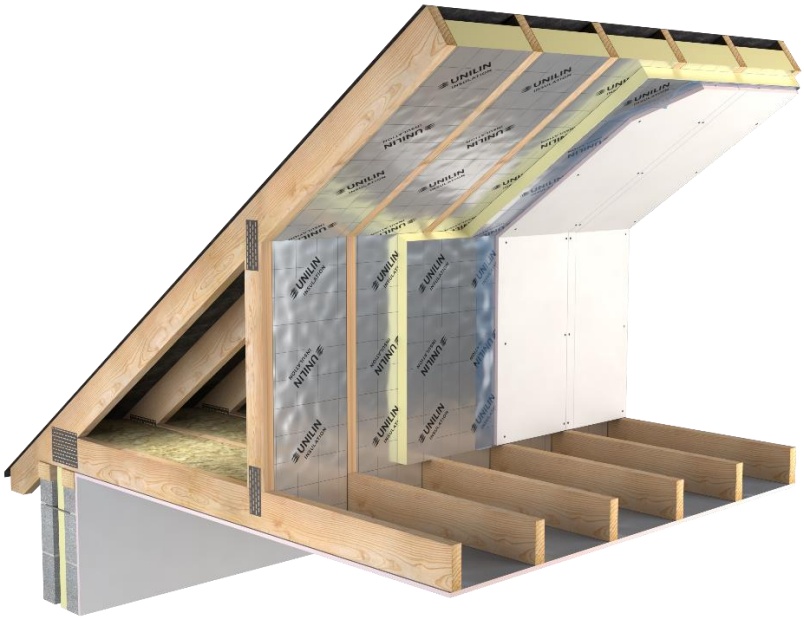
4.7 DURABILITY

Unilin Thin-R Partial Fill Cavity Wall Boards are rot-proof and durable. As cavity wall insulation, Unilin Thin-R Partial Fill Cavity Wall 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.

Public

NSAI Agrément

Unilin Thin-R Pitched Roof Board (XT/PR_UF Grade)



PRODUCT DESCRIPTION:
This Detail Sheet relates to Unilin Thin-R Pitched Roof Board, as defined in NSAI Agrément Certificate 03/0183. Unilin Thin-R Pitched Roof Board uses Polyisocyanurate (Polyiso), a thermoset closed cell rigid foam insulation manufactured in accordance with I.S. EN 13165:2012+A2:2016, *Thermal insulation products for buildings – Factory made rigid polyurethane foam (PU) 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 of pitched and tiled roofs constructed in accordance with ICP 2:2002 *Code of practice for slating and tiling*. It can be used between, below, below and between, above or above and between rafters. It also facilitates the control of surface and interstitial condensation in roofs.

Part One / Certification 1

1.1 ASSESSMENT
In the opinion of NSAI Agrément, Unilin Thin-R Pitched Roof Board if used in accordance with this Detail Sheet, meets the requirements of the Building Regulations 1997 to 2024, hereafter referred to as the Building Regulations, as indicated in Section 1.2 of Certificate 03/0183.

1.2 BUILDING REGULATIONS 1997 to 2024
This matter is dealt with in NSAI Agrément Certificate 03/0183.

Public

2.1 PRODUCT DESCRIPTION

Unilin Thin-R Pitched Roof Board consists of a rigid Polyiso foam core with low emissivity trilaminate aluminium foil facings both sides. The edges of the boards are square, T&G or rebated. The system is an efficient single or double layer system combining insulation above and/or between and/or below rafters to form a roof that has many advantages over traditional methods of insulating at roof level providing a high level of thermal insulation in new and existing pitched roofs. Manufactured to I.S. EN 13165:2012 and tested to ensure compliance with the requirements for compressive strength, water vapour transmission, thermal conductivity, thermal resistance and dimensional stability.

Unilin Thin-R Pitched Roof Boards are placed above and/or below and/or between rafters in conjunction with vapour permeable roof tile underlay, treated timber counter battens and tiling battens on roofs which have been designed in accordance with SR 82:2017, *Slating and Tiling - Code of Practice.* The XT/PR board does not contain either CFC or HCFC gases and has zero Ozone Depletion Potential.

Table 1 shows the Unilin Thin-R Pitched Roof Board product range.

Length	2400mm
Width	1200mm
Thickness	25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 90, 100, 120, 125, 140, 150, 165, 180mm
Grade	PIR
Other sizes are available subject to quantity	

Table 1: Product Range

The following ancillary products are used with the boards:

- Vapour permeably underlays used in conjunction with Unilin Thin-R Pitched Roof Board should be subject to current certification and installed in accordance with manufacturer's instructions for warm roof applications.
    - Helifix Inskew or other approved proprietary fixings should be used in accordance with SR 82:2017 and manufacturer's instructions.

Names of approved fixings and addresses of suppliers are available from Unilin Ltd.

2.2 INSTALLATION

2.2.1 General

Installation must be in accordance with the relevant clauses of SR 82:2017 and the manufacturer's instructions and can be carried out in all conditions normal for roof construction.

The boards are light to handle and can be easily cut or shaped. The boards will not support the weight of operatives and care must be taken during tiling.

Cavity barriers should be provided at the junction of the external wall and roof space in accordance with the requirements of Part B of the Irish Building Regulations.

2.2.2 Procedure – Single/Double Layer Over Rafters (Warm Roof)

Ensure that the Unilin Thin-R Pitched Roof Board has been continued to roof height to engage with the roof insulation. The insulation must be continuous to provide a complete envelope to reduce the risk of thermal bridging and condensation risk.

A treated timber stop rail, the same thickness as the Unilin Thin-R Pitched Roof Board, is fixed to the rafters close to the eaves to provide a firm fixing point for the counter battens. The Unilin Thin-R Pitched Roof Boards are laid over the rafters commencing at the stop rail. The boards should be tightly butted and positioned in a staggered pattern with all the joints running from eaves to ridge occurring over the rafters. Repeat the procedure using crawling boards until the entire area from eaves to ridge has been covered. The insulation will not support operatives. Any gaps in the insulation must be sealed with flexible sealant or expanding foam. Use large headed clout nails to hold boards temporarily in place until the counter battens secure them.

Treated counter battens are fixed through the insulation into the rafter with Helifix Inskew (or other approved proprietary) fixings at the appropriate centres, taking account of the specific roof design, e.g. pitch, weight of slates/tiles and location of the building. Additional Unilin XT/PR can be placed between the counter-battens to improve U values.

The vapour permeable roof tile underlay is laid in accordance with its NSAI Agrément Certificate and manufacturer's instructions.

Slating and tiling is installed in accordance with SR 82:2017. When the relevant space is to be used as a living area, the Unilin Thin-R Pitched Roof Board should be covered with 12.5mm plasterboard.

2.2.3 Procedure – Double Layer Over and Between Rafters (Warm Roof)

Unilin Thin-R Pitched Roof Board is used as a double layer when insulation values required create an excessive thickness for a single layer application.

The first layer of Unilin Thin-R Pitched Roof Board is cut to size and placed between the rafters on timber batten carriers or sarking clips that are nailed up the slope of the roof. The upper face of the board should be kept flush with the top of the rafter. The second layer over the rafters is applied as previously detailed in Section 2.2.2 of this Detail Sheet.

2.2.4 Procedure – Ventilated Roofs (Cold Roof)

Warm pitched roofs as described in Section 2.2.3 of this Certificate may be the best solution for pitched roof insulation, but it is only suitable for new construction and some limited refurbishments where the roof covering is to be replaced. Placing the Unilin Thin-R Pitched Roof board between and/or below the rafter is another solution.

This type of construction creates a 'cold roof' and because of the risk of interstitial condensation, the Irish Building Regulations require a continuous 50mm ventilation space is maintained. Care should be taken to ensure the ventilation space is not reduced and battens fixed to the rafters may be used as a retaining stop. In many constructions it may be necessary to fix only one layer of Unilin Thin-R Pitched Roof Board between the rafters to achieve the relevant U-value, however where the requirement is for very low U-values or to reduce the effects of thermal bridging, a second layer fixed to the rafters over the first layer may be appropriate. As in the solution for 'warm roof' when the relevant space is to be used as a living area, the Unilin Thin-R Pitched Roof Board should be covered with 12.5mm plasterboard.

In accordance with the Building Regulations, a 50mm ventilation space should be maintained between the sarking felt and the insulation, unless a breather membrane is used allowing for a reduction in the recommended airspace. Refer to manufacturer's instructions and conditions of the NSAI Agrément Certificate.

On-site trimming of boards where necessary to maintain continuity of insulation at rooflights, roof windows or other opes is easily executed using a fine-tooth saw of builder's knife.

Figures 1 and 2 show installation details.

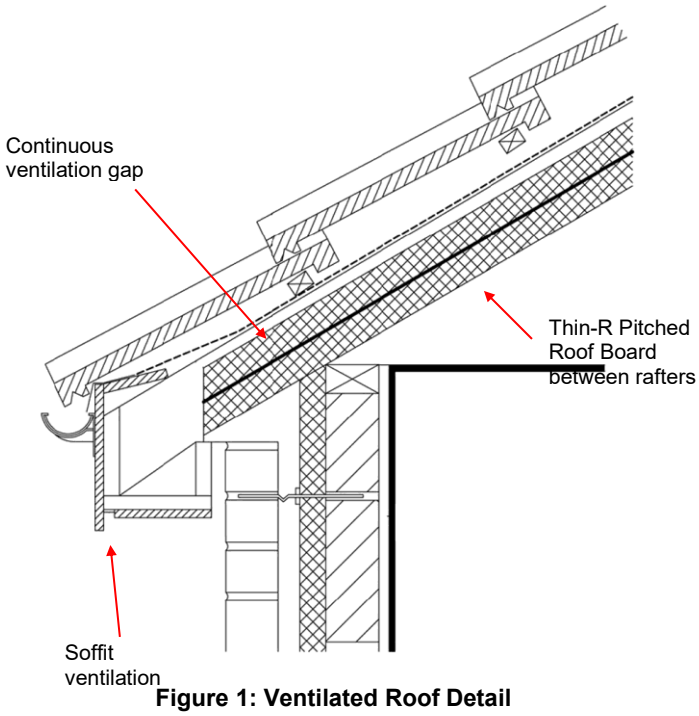


Figure 1: Ventilated Roof Detail

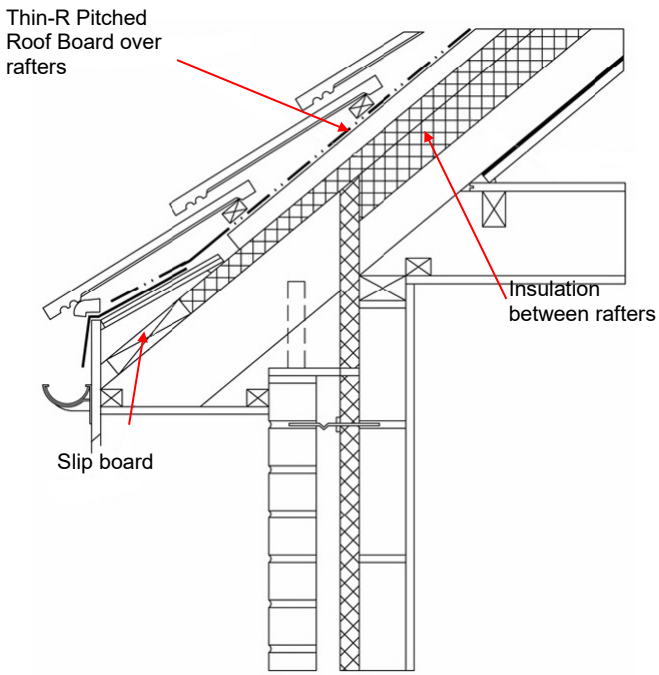


Figure 2: Warm Roof Detail

Public

Part Three / Design Data 3

3. GENERAL

3.1 Unilin Thin-R Pitched Roof Board when installed in accordance with this Detail Sheet, is effective in reducing the U-value (thermal transmittance) of new and existing pitched roof constructions. It is essential that such roofs are designed and constructed to prevent moisture penetration having regard to the Driving Rain Index.

3.2 Roofs subject to the relevant requirements of the Irish Building Regulations should be constructed in accordance with SR 82:2017.

3.3 During installation, boards must not be walked on except over supporting timbers. The boards have insufficient nail holding ability to be considered as an alternative to timber sarking.

3.4 Roof tile underlays must be approved by the manufacturer and be the subject of a current NSAI Agrément Certificate for such use. Underlays should be installed in accordance with, and within the limits of, that Certificate.

3.5 Moisture entering the roof must be minimised using a minimum of 500 gauge polyethylene with sealed gaps, placed under the inclined ceiling. Gaps in the ceiling should be minimised and service openings should be sealed.

3.6 The manufacturer has taken the responsibility of CE marking the products in accordance with harmonised standard I.S. EN 13165:2012+A2:2016, Thermal insulation products for buildings - Factory made rigid polyurethane foam (PU) products - Specification. An asterisk (*) appearing in this Certificate indicates that data shown is given in the manufacturer's Declaration of Performance.

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

Part Four / Technical Investigations 4

4.1 BEHAVIOUR IN FIRE

Combustibility –Unilin Thin-R Pitched Roof Board has a reaction to fire classification of NPD to IS EN 13501-1. The boards are combustible and must be protected from naked flames and other ignition sources during and after installation.

The use of Unilin Thin-R Pitched Roof Board will not affect the fire rating obtained by the tiled/slated roof when assessed or tested to BS 476-3:2004 *fire tests on building materials and structures – Classification and method of test for external fire exposure to roofs*.

Toxicity – Negligible when used in a ground floor construction.

As Unilin Thin-R Pitched Roof Board XT/PR is manufactured without the use of CFC or HCFC gases, there is no release of such gas on burning.

4.2 STRENGTH

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

4.3 RESISTANCE TO WIND LOAD

The resistance to wind uplift depends on many factors peculiar to each project. The effect of wind loading should be calculated in accordance with I.S. EN 1991-1-4, *Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions*, using the appropriate basic wind speed shown on the map in Diagram 1 of TGD to Part A of the Irish Building Regulations

Unilin Thin-R Pitched Roof Board, when installed in accordance with this Detail Sheet, will have sufficient resistance to wind uplift.

4.4 RESISTANCE TO MOISTURE

Unilin Thin-R Pitched Roof Board will not be adversely affected by rain during installation or by wind driven snow or rain penetrating the tiling in service. Water absorption is low and the influence on the thermal conductivity value is minimal.

4.5 CONDENSATION RISK

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, filled/sealed joints and gaps will provide a continuous convection free envelope of high vapour resistance. Therefore, a suitable underlay may be laid over the insulation without ventilated airspace.

Where high humidity may be expected, a vapour control layer should be used unless a condensation risk assessment in accordance with BS 5250:2021 shows that it is not necessary. The risk of interstitial condensation is greatest when the building is drying out after construction. To prevent condensation problem arising, additional ventilation, other than normally required, may be needed.

Public

Property	Declared Value	Test Method
Reaction to Fire	NPD*	EN 13501
Dimensional Stability	DS(70,90)4*	EN 1604
Density	32 kg/m^3	EN 1602
Compressive Strength	CS (10/Y) 150*	EN 826
Thermal Conductivity	0.022* W/mK	EN 12667
Thermal Resistance - 35 mm - 40 mm - 60 mm - 80 mm - 100 mm - 120 mm - 140 mm - 165 mm - 180 mm	 1.60 m^{2}K/W 1.83 m^{2}K/W 2.74 m^{2}K/W 3.65 m^{2}K/W 4.57 m^{2}K/W 5.48 m^{2}K/W 6.39 m^{2}K/W 7.53 m^{2}K/W 8.22 m^{2}K/W	

Table 2: Physical Properties of Unilin Thin-R Pitched Roof Board

	Insulation above rafter	Insulation above and between rafter	Insulation above and between battens
U-value (W/m^{2}K)	**400mm centres**	**400mm centres**	**400mm centres**
0.20	100	40/80	60/60
0.25	75	40/50	40/50
	600mm centres	**600mm centres**	**600mm centres**
0.20	100	40/75	50/60
0.25	75	40/40	40/50

Table 3: Pitched Roof Constructions – Typical U-values – Warm Roof

	Insulation in slope of rafter	Insulation in slope of rafter
U-value (W/m^{2}K)	**400mm Centres**	**400mm Centres**
0.20	80 + 90	100/40
0.25	60 + 70	80/30
0.35	90	50/25
	600mm Centres	**600mm Centres**
0.20	70 + 80	90/40
0.25	60 + 60	80/30
0.35	80	50/25

Table 4: Pitched Roof Constructions – Typical U-values – Ventilated roof

4.6 THERMAL INSULATION

The aged thermal conductivity '$\lambda_{90/90}$' value of Unilin Thin-R Pitched Roof Board, when measured in accordance with IS EN 12667:2001, and calculated in accordance with Annex C of I.S. EN 13165:2012 is 0.022* W/m.K. The required maximum U-values for pitched roofs can be obtained with Unilin Thin-R Pitched Roof Board constructions as indicated in Table 3 and Table 4. The DoHLGH publication *Limiting Thermal Bridging & Air Infiltration – Acceptable Construction Details* gives guidance on limiting cold bridging and should be referred to.

4.7 DURABILITY

Unilin Thin-R Pitched Roof Boards are rot-proof and durable. As roof insulation, Unilin Thin-R Pitched Roof 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 this Detail Sheet.

4.8 MAINTENANCE AND REPAIR

Damaged boards can be easily replaced prior to the installation of counter battens.

The product is light to handle and can be easily cut, but care must be taken to prevent damage. Since the board will not support the weight of operatives appropriate care must be taken during tiling/slating.

Unilin Thin-R Underfloor Board (XT/PR_UF Grade)



PRODUCT DESCRIPTION:
This Detail Sheet relates to Unilin Thin-R Underfloor Board, as defined in NSAI Agrément Certificate 03/0183. Unilin Thin-R Underfloor Board uses Polyisocyanurate (Polyiso), a thermoset closed cell rigid foam insulation manufactured in accordance with I.S. EN 13165:2012+A2:2016, *Thermal insulation products for buildings – Factory made rigid polyurethane foam (PU) 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, Unilin Thin-R Underfloor Board if used in accordance with this Detail Sheet, meets the requirements of the Building Regulations as indicated in Section 1.2 of Certificate 03/0183.

1.2 BUILDING REGULATIONS 1997 to 2024
This matter is dealt with in NSAI Agrément Certificate 03/0183.

Public

2.1 PRODUCT DESCRIPTION

Unilin 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. Unilin 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 I.S. EN 13165:2012 and tested to ensure compliance with the requirements for compressive strength, water vapour transmission, thermal conductivity, thermal resistance and dimensional stability.

Unilin 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/PR_UF board does not contain either CFC or HCFC gases and has zero Ozone Depletion Potential.

Table 1 shows the Unilin 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 Unilin 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.

Unilin 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 with a minimum thermal resistance of 1.0 m^2K/W 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 Unilin 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 8203:2017, *Installation of resilient floor coverings - Code of practice*.
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.

Unilin Thin-R Underfloor Board should be laid with joints tightly butted. During construction the Unilin 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. Unilin 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 Unilin 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

Unilin 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, Unilin 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.

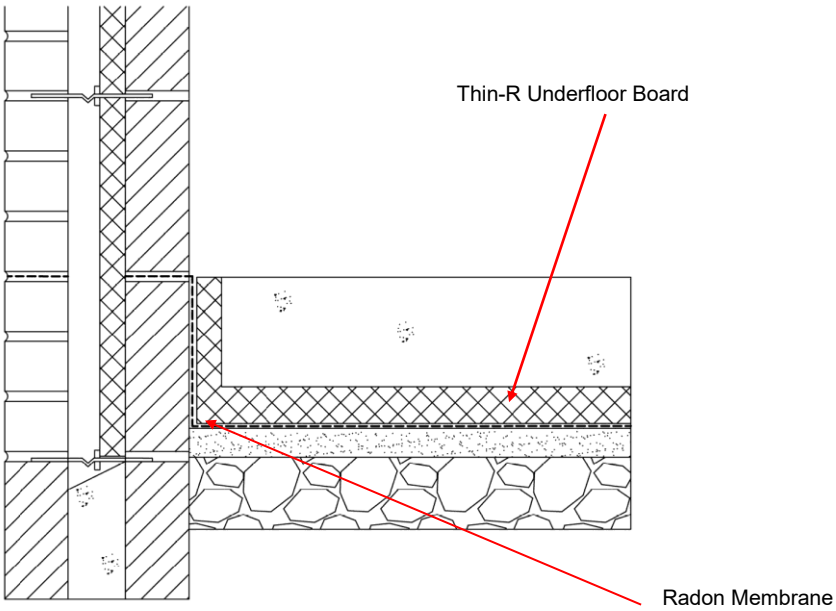


Figure 1: Solid Floor Detail with Radon Membrane

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.

Part Three / Design Data 3

3.1 GENERAL
Unilin 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 Unilin Thin-R Underfloor Board must include a suitable damp proof/ radon membrane. Suspended concrete ground floors incorporating Unilin Thin-R Underfloor Board must include suitable ventilation (see Figure 2) and void should remain inaccessible.

The overlay to Unilin 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 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.*

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

Where Unilin 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 100ºC. Unilin 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.

3.5 CE MARKING
The manufacturer has taken the responsibility of CE marking the products in accordance with harmonised standard I.S. EN 13165:2012+A2:2016, Thermal insulation products for buildings - Factory made rigid polyurethane foam (PU) products - Specification. An asterisk (*) appearing in this Certificate indicates that data shown is given in the manufacturer's Declaration of Performance. Reference should be made to the latest version of the manufactures DoP for current information on any essential characteristics declared by the manufacturer.

Public

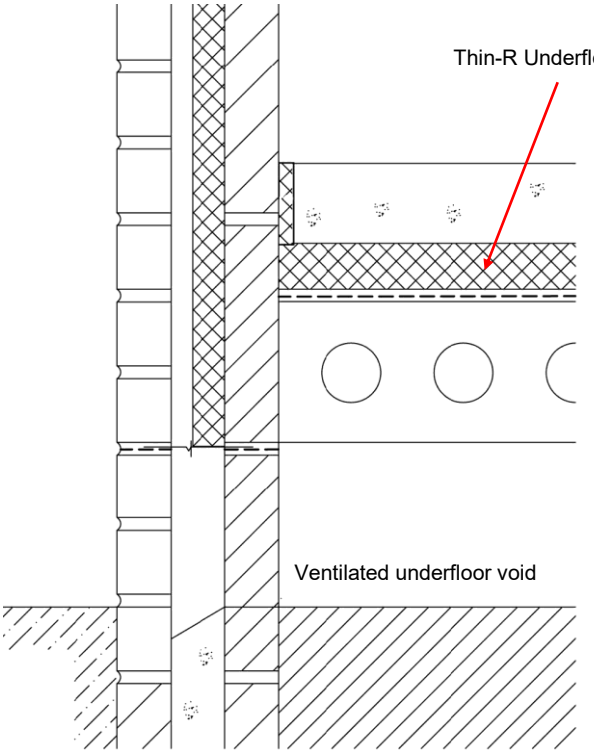


Figure 2: Suspended Concrete Ground Floor Detail

4.1 BEHAVIOUR IN FIRE

Combustibility –Unilin Thin-R Underfloor Board XT/UF has a reaction to fire classification of NPD to IS EN 13501-1. 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 or as detailed in Diagram 4 of TGD to Part J of the Irish Building Regulations.

Toxicity – Negligible when used in a ground floor construction.

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

4.2 STRENGTH

Unilin 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

Unilin 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

Unilin 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 Unilin Thin-R Underfloor Board, when measured in accordance with IS EN 12667:2001, and calculated in accordance with Annex C of I.S. EN 13165:2012 is 0.022* W/m.K. The required maximum U-values for ground floors can be obtained with Unilin Thin-R Underfloor Board constructions as indicated in Table 3. The DoHLGH publication *Limiting Thermal Bridging & Air Infiltration – Acceptable Construction Details* gives guidance on limiting cold bridging and should be referred to.

4.6 DURABILITY

Unilin Thin-R Underfloor Boards are rot proof and durable. As floor insulation, Unilin 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
Reaction to Fire	NPD*	EN 13501
Dimensional Stability	DS(70,90)4*	EN 1604
Density	32 kg/m^3	EN 1602
Compressive Strength	CS (10/Y) 140	EN 826
Thermal Conductivity	0.022* W/mK	EN 12667
Thermal Resistance		
- 35 mm	1.60 m^{2}K/W	
- 40 mm	1.83 m^{2}K/W	
- 50 mm	2.28 m^{2}K/W	
- 60 mm	2.74 m^{2}K/W	
- 65 mm	2.97 m^{2}K/W	
- 70 mm	3.20 m^{2}K/W	
- 80 mm	3.65 m^{2}K/W	
- 90 mm	4.11 m^{2}K/W	
- 100 mm	4.57 m^{2}K/W	
- 110 mm	5.02 m^{2}K/W	
- 120 mm	5.48 m^{2}K/W	
- 130 mm	5.94 m^{2}K/W	
- 140 mm	6.39 m^{2}K/W	
- 150 mm	6.85 m^{2}K/W	
- 165 mm	7.53 m^{2}K/W	
- 180 mm	8.22 m^{2}K/W	

Table 2: Physical Properties of Unilin 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)	63	76	85	90	93	96	97	99	100

*Perimeter/Area

Table 3: Ground Floor Constructions to achieve 0.18 W/m^{2}K U value

Public

Unilin Thin-R Thermal Liner (XT/TL Grade)



PRODUCT DESCRIPTION:
This Detail Sheet relates to Unilin Thin-R Thermal Liner, as defined in NSAI Agrément Certificate 03/0183. Unilin Thin-R Thermal Liner is a composite panel consisting of a Polyisocyanurate (Polyiso) foam core with composite kraft paper face or trilaminate foil back, bonded to plasterboard for internal applications. Polyiso is a thermoset closed cell rigid foam insulation manufactured in accordance with I.S. EN 13165:2012+A2:2016, *Thermal insulation products for buildings – Factory made rigid polyurethane foam (PU) 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 the facings.

USE:
The product is used for the thermal insulation of existing or new, solid or cavity masonry walls or ceilings of dwellings or buildings of similar occupancy type and conditions. It also facilitates the control of surface and interstitial condensation in walls and ceilings.

Part One / Certification 1

1.1 ASSESSMENT
In the opinion of NSAI Agrément, Unilin Thin-R Thermal Liner if used in accordance with this Detail Sheet, meets the requirements of the Irish Building Regulations 1997 to 2024, hereafter referred to as the Building Regulations in this Certificate, as indicated in Section 1.2 of Certificate 03/0183.

1.2 BUILDING REGULATIONS 1997 to 2024
This matter is dealt with in NSAI Agrément Certificate 03/0183.

Public

2.1 PRODUCT DESCRIPTION

Unilin Thin-R Thermal Liner is a composite panel consisting of a rigid Polyiso foam core with composite kraft paper facing or trilaminate foil back factory bonded to plasterboard. The plasterboard is 9.5, 12.5 or 15mm thick. Polyiso is manufactured to I.S. EN 13165:2012. The XT/TL board does not contain either CFC or HCFC gases and has zero Ozone Depletion Potential. Table 1 shows the Unilin Thin-R Thermal Liner product range.

Length	2400, 2438, 2600, 2740mm
Width	600, 1200mm
Thickness	25, 38, 45, 50, 55, 65 and 70mm*
Grade	PIR
Other sizes are available subject to quantity * Refers to insulation thickness only	

Table 1: Product Range

2.2 INSTALLATION

2.2.1 General

Unilin Thermal Liner is for installation on the internal surface of walls and ceilings of new or existing buildings. The fixing method depends on the substrate.

Installation should be in accordance with good drylining practice and the manufacturer's instructions. All installations require careful planning and setting out.

Before fixing the product, sufficient time must be allowed to disperse the solvents contained in wood preservatives and damp proofing treatments where applied.

2.2.2 Systems and Fixings

Thermal Bridging

Walls should be insulated to full height and returned at door/window reveals to prevent cold bridging. The thickness of Unilin Thin-R Thermal Liner at reveals may, if necessary, be reduced to a minimum thickness of 25mm. Services should be fixed in place before drylining commences. The void between the wall and the Unilin Thin-R Thermal Liner can accommodate certain services, however the Polyiso insulation should not be chased. The area around any services that penetrate the Unilin Thin-R Thermal Liner must be sealed to prevent air leakage and thermal looping.

Thermal Looping/Fire Stops

Fire stops must be provided using proprietary methods or by applying a continuous 50mm ribbon of dry wall adhesive to the top and bottom edge of each sheet. A treated timber batten will also suffice.

Installation Procedure 1 – Adhesive Dabs

Align Unilin Thin-R Thermal Liner on the wall allowing a 20mm expansion joint at the top and bottom of the panel and mark the position of the panel on the wall. Apply adhesive dabs to the wall ensuring a continuous 50mm ribbon top and bottom to provide firestops. Dabs should be applied in accordance with BS 8212:1995 *Code of practice for dry lining and partitioning using gypsum plasterboard* and BS 8000-8:1994 *Workmanship on building sites – code of practice for plasterboard partitions and dry linings*. Lift the Unilin Thin-R Thermal Liner into position using wedges on the floor to position the boards. Apply pressure to the board to level and embed the adhesive. Ensure all gaps are filled with sealant. The Irish Building regulations may require the provision of vertical cavity barriers in long runs of lining. Such barriers can be formed using a continuous vertical line running down the centre of the board.

Additional mechanical fixings should be provided to each board applying a minimum of 2 metal fixings, after the adhesive has set, in accordance with BS 8212:1995 and manufacturer's instructions.

Installation Procedure 2 – Adhesive Dabs and Battens

Align Unilin Thin-R Thermal Liner squarely on the wall allowing a 20mm expansion joint at the top and bottom of the panel and mark the position of the panel on the wall. Fix a pre-treated timber batten horizontally at ceiling level and another 20mm above the finished floor level. Cut strips from the top and bottom insulation backing on the Unilin Thin-R Thermal Liner to accommodate the battens. The insulation should be cut back to accommodate an adjoining panel at external corners. Apply adhesive dabs to the back of the panel. Continuous ribbons must also be placed around all service penetrations and openings. Life the Unilin Thin-R Thermal Liner into position using wedges on the floor to position the boards. Apply pressure to the board to level and embed the adhesive. Fix the Unilin Thin-R Thermal Liner to the top and bottom battens. Screws should be fixed to the timber batten at 150mm centres, at least 12mm in from the board edge. The fixings should penetrate at least 25mm into the batten. Ensure all gaps are filled with sealant.

A minimum of 3 no. metal nailable plugs should be used per sheet.

Installation Procedure 3 – Battens Only

Align Unilin Thin-R Thermal Liner squarely on the wall allowing a 20mm expansion joint at the top and bottom of the panel and mark the position of the panel on the wall. Fix a pre-treated timber batten horizontally at ceiling level and another 20mm above the finished floor level. Fix vertical battens at max 600mm centres, and additional battens to support all board edges. Ensure the battens are wide enough to offer 20mm support to all four edges of the plasterboard and pack if necessary to level the Unilin Thin-R Thermal Liner. Trim all openings with battens. The insulation should be cut back to accommodate an adjoining panel at external corners. Life the Unilin Thin-R Thermal liner into position using wedges on the floor to position the panels. Fix the Unilin Thin-R Thermal Liner to the battens. Screws should be fixed to the timber batten at 150mm centres, at least 12mm in from the board edge. The fixings should penetrate at least 25mm into the batten. Ensure all gaps are filled with sealant.

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

Tapered edge boards are jointed and finished in accordance with standard dry lining procedure offering a surface suitable for paper hanging and paint finishes.

Good workmanship and appropriate site procedures are necessary to achieve expected thermal and air tightness performance.

Installation Procedure 4 – Ceilings
Unilin Thin-R Thermal Liner may be used to line either horizontal or sloped ceilings. All four edges of the boards should be supported by rafters, joists or battens by at least 20mm. This may necessitate the addition of timber noggins where necessary. Large headed clout nails, sheridised nails or drylining screws should be used to fix the boards. Fix the Unilin Thin-R Thermal liner to all the rafters at 150mm centres. Fixings should be located at least 12mm in from the board edge and penetrate at least 25mm into the timber.

Part Three / Design Data 3

3.1 GENERAL
Unilin Thin-R Thermal Liner when installed in accordance with this Detail Sheet is effective in reducing the U-value (thermal transmittance) of new or existing walls and ceilings.

Unilin Thin-R Thermal Liner may be used to insulate clay or calcium silicate bricks, concrete blocks, hollow concrete blocks, or natural and reconstituted stone blocks. It is essential that such walls are designed and constructed to prevent moisture penetration having regard to the Driving Rain Index.

Buildings subject to the relevant requirements of the Irish Building Regulations should be constructed in accordance with IS 325-1:1986 *Use of masonry – Structural use of unreinforced masonry* and BS 5628-3:2001 *Code of practice for use of masonry – Materials and components, design and workmanship*. Particular attention should be paid to the exclusion of moisture in that the designer should select a construction appropriate to the local wind driven rain index, paying due regard to the design detailing, workmanship and materials to be used. Where reinforced masonry is involved, the design should be in accordance with BS 5628-2:2000 *Code of practice for use of masonry – Structural use of reinforced and prestressed masonry* should be followed where the wall incorporates stone or cast stone.

With dry lining installations forming a void of 20mm or more, services can be incorporated behind the dry lining, making the chasing of the wall unnecessary. When using adhesive systems, or where the services have a greater depth than the void, the wall should be chased rather than the insulation.

All mould or fungal growth should be treated prior to the application of the product.

When bonding is by adhesives, apply adhesive dabs to the wall in accordance with BS 8212:1986 and BS 800-8:1994. Vertical dabs @ 300mm centres, 25mm in from the edge. Dabs 50 – 75mm wide approximately 25mm deep to allow for tamping. Total contact with board area should be 20%. Backgrounds of high suction will behave differently to those of low suction. The Certificate holder's advice should be sought in case of difficulty. Maximum installation height for this system is 3m.

It is very important that manufacturer's instructions regarding the use of recessed lighting with this product should be followed.

3.2 CE MARKING
The manufacturer has taken the responsibility of CE marking the products in accordance with harmonised standard I.S. EN 13950, Thermal insulation products for buildings - Factory made rigid polyurethane foam (PU) products - Specification. An asterisk (*) appearing in this Certificate indicates that data shown is given in the manufacturer's Declaration of Performance. Reference should be made to the latest version of the manufactures DoP for current information on any essential characteristics declared by the manufacturer.

Public

4.1 BEHAVIOUR IN FIRE

The plasterboard used in the Unilin Thin-R Thermal Liner is deemed to be Euroclass B-s1, d0 in accordance with the Irish Building Regulations. The insulation component of the board should be isolated from possible sources of combustion.

To achieve this, Unilin Thin-R Thermal Liner should be installed in accordance with the following:

- Combustible material shall be separated by solid non-combustible material not less than 200mm thick from a flue pipe to an oil, solid fuel or gas heating appliance as indicated in Section 2 of TGD to Part J of the Irish Building Regulations.
- The Unilin Thin-R Thermal Liner should be separated by a minimum distance of 150mm from an oil, solid fuel or gas heating appliance as indicated in Diagram 8 of TGD to Part J of the Irish Building Regulations.
- Unilin Thin-R Thermal Liner when installed with a residual cavity between the board and the wall, will require the provision of cavity barriers and may be used in buildings of any purpose group provided:
  (a) Cavity barriers in walls are provided at maximum distances apart of 10m unless a Class 1 material is exposed to the cavity when a spacing of 20m may be adopted.
  (b) Every such cavity shall be closed by a cavity barrier around the whole perimeter of the wall or ceiling element and around the perimeter of any opening through such elements.
  (c) Cavity barriers in spaces between a floor and ceiling are provided at maximum distances of 20m for any class of surface exposed to the cavity.
  (d) Where any wall or ceiling containing a cavity meets another such element, the cavities shall be closed so that they do not communicate with one another.
  Direction on the provision and spacing of cavity barriers is given in Tables 3.2 and 3.3 of TGD to Part B of the Irish Building Regulations.

4.2 WATER PENENTRATION

The closed cell structure does not allow water uptake by capillary action. Unilin Thin-R Thermal Liner when used in accordance with this Detail Sheet presents no significant risk of water penetration.

4.3 THERMAL INSULATION

The aged thermal conductivity '$\lambda_{90/90}$' value of Unilin Thin-R Thermal Liner, when measured in accordance with IS EN 12667:2001, and calculated in accordance with Annex C of I.S. EN 13165:2012 is 0.022* W/m.K. The required maximum U-values for external walls can be obtained with Unilin Thin-R Thermal Liner constructions as indicated in Table 3.

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

4.4 MATERIALS IN CONTACT WITH ELECTRICAL WIRING

Where electrical cables have no option by of running within the insulation component of the Unilin Thin-R Thermal Liner, then the cables must be enclosed in a suitable conduit, e.g. rigid PVC, as outlined in the National rules for the Electrical Installation (I.S.10101).

4.5 CONDENSATION RISK

Unilin Thin-R Thermal Liner has a high vapour resistance and is therefore unlikely to be affected by surface or interstitial condensation, provided all joints between boards are filled and taped in accordance with good dry lining practice. Interstitial condensation analysis for average winter environmental conditions for both hollow blockwork and cavity wall constructions indicate no condensation risk.

When insulating buildings, the recommendations of IS EN 13788 *Hydrothermal performance of building components and building elements – Internal surface temperature to avoid critical surface humidity and interstitial condensation – Calculation methods* should be followed to minimise the risk of condensation within the building elements and structures.

4.6 INFESTATION

Unilin Thin-R Thermal Liner panels do not promote infestation, as there is no food value in the materials used.

4.7 WALL MOUNTED FITTINGS

The recommendations of the manufacturer should be followed. Any object fixed to the wall, other than lightweight items, e.g. framed pictures, should be fixed through the lining board into the wall behind, using proprietary fixings.

4.8 MAINTENANCE

Damaged boards can be easily replaced prior to the installation of counter battens. No maintenance of the insulation will be required provided that the plasterboard inner layer remains intact.

4.9 DURABILITY

Unilin Thin-R Thermal Liner boards are rot proof and durable. As internal dry lining, Unilin Thin-R Thermal Liner 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
Reaction to Fire	Euroclass B s1d0*	EN 13501
Density	32 kg/m^3	EN 1602
Flexural Strength	≥ 160N* transverse ≥ 400N* longitudinal	EN 13950
Thermal Conductivity	0.022* W/mK	EN 12667
Thermal Resistance - 25 mm - 38 mm - 50 mm - 55 mm - 65 mm - 70 mm	 1.14 m^{2}K/W 1.74 m^{2}K/W 2.28 m^{2}K/W 2.51 m^{2}K/W 2.97 m^{2}K/W 3.20 m^{2}K/W	

Thermal resistances shown are for insulation only.
Thermal resistances of plasterboard should be added: 15mm = 0.06m^{2}K/W; 12.5mm – 0.05m^{2}K/W ; 9.5mm – 0.038 m^{2}K/W

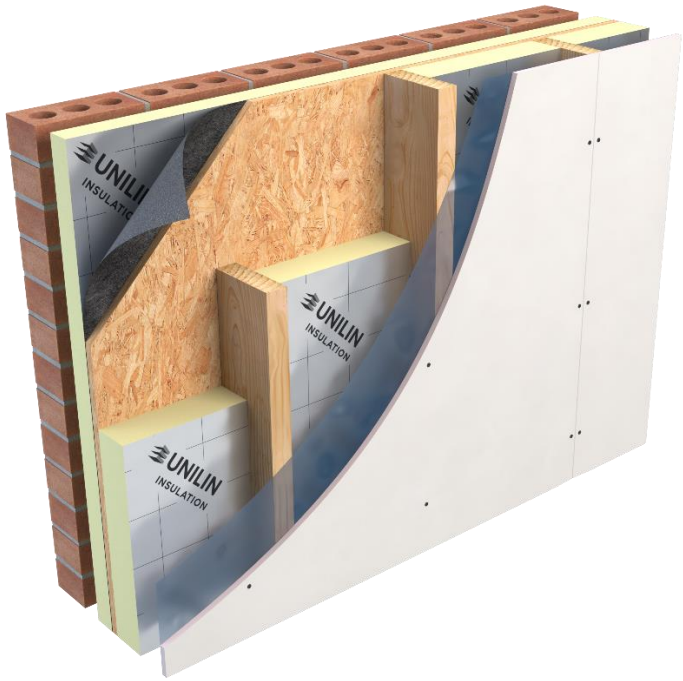
Table 2: Physical Properties of Unilin Thin-R Thermal Liner

Unilin Thin-R Thermal Liner on Dabs			
U-value (W/m^{2}K)	**0.45**	**0.37**	**0.27**
On Hollow Block	35mm	50mm	70mm
On Cavity Wall	35mm	45mm	65mm
Unilin Thin-R Thermal Liner on Battens			
U-value (W/m^{2}K)	**0.45**	**0.37**	**0.27**
On Hollow Block	35mm	45mm	65mm
On Cavity Wall	30mm	40mm	60mm

Table 3: Thicknesses of Unilin Thin-R Thermal Liner Required to Achieve Specified U-values

Public

Unilin Thin-R Timber Frame Board (XT/TF Grade)



PRODUCT DESCRIPTION:
This Detail Sheet relates to Unilin Thin-R Timber Frame Board, as defined in NSAI Agrément Certificate 03/0183. Unilin Thin-R Timber Frame Board uses Polyisocyanurate (Polyiso), a thermoset closed cell rigid foam insulation manufactured in accordance with I.S. EN 13165:2012+A2:2016, *Thermal insulation products for buildings – Factory made rigid polyurethane foam (PU) 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 of timber framed walls by inserting between the studs and/or used as an insulated drylining or insulated sheathing insulation. It also facilitates the control of surface and interstitial condensation in walls.

Part One / Certification 1

1.1 ASSESSMENT
In the opinion of NSAI Agrément, Unilin Thin-R Timber Frame Board if used in accordance with this Detail Sheet, meets the requirements of the Irish Building Regulations 1997 to 2024, hereafter referred to as the Building Regulations in this Certificate, as indicated in Section 1.2 of Certificate 03/0183.

1.2 BUILDING REGULATIONS 1997 to 2024
This matter is dealt with in NSAI Agrément Certificate 03/0183.

Public

NSAI Agrément

Part Two / Technical Specification and Control Data 2

2.1 PRODUCT DESCRIPTION

Unilin Thin-R Timber Frame Board consists of a rigid Polyiso foam core with low emissivity trilaminate aluminium foil facings both sides. The XT/TF board does not contain either CFC or HCFC gases and has zero Ozone Depletion Potential.

Table 1 shows the Unilin Thin-R Timber Frame Board product range.

Length	2400mm
Width	1200mm
Thickness	20, 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 Between Studs

Unilin Thin-R Timber Frame Board should be cut to fit tightly between the timber studding and positioned against the inner face of sheathing board. The insulation should be held in place by nails or timber battens to the warm side of the insulation. The void created by space between the inner surface of the Unilin Thin-R Timber Frame Board and the dry lining can be utilised as an insulated service duct.

2.2.2 Thermal Bridging

Careful consideration must be given to the area of solid timber that may present a significant area of cold bridging if not insulated correctly. The area of solid timber in a construction could amount to more than 15% of the total wall area, which would dramatically affect the overall U-value of the structure. Lining the surface of the wall with a second layer of Unilin Thin-R Timber Frame Board will effectively reduce the amount of thermal bridging and provide a robust construction.

2.2.3 Insulated Dry Lining

Mineral wool quilt should be fitted snugly between the timber studs, ensure all services are fixed and any air gaps are filled with insulation. Temporarily fix the Unilin Thin-R Timber Frame Board to the inner face of the timber studding ensuring that the insulation makes contact or overlaps ceiling and floor insulation. Mark the line of the timber studs on the insulation to allow fixing of the dry lining plasterboard. Boards should be butted tightly against each other to prevent gaps. Fix the plasterboard lining over the Unilin Thin-R Timber Frame Board and secure with approved nails or screws to the appropriate length. Unilin Thin-R Timber Frame Boards are jointed and finished in accordance with standard dry lining practice offering a surface suitable for paper hanging and pain finishes. The fixing of Unilin Thin-R Thermal Liner boards should be in accordance with Detail Sheet 4 of this Certificate.

On-site trimming of boards is easily executed using a fine-tooth saw or by scoring with a sharp builders knife and snapping the board face down over a straight edge and cutting the foil facing on the other side.

Good workmanship and appropriate site procedures are necessary to achieve expected thermal and air tightness performance.

Part Three / Design Data 3

3.1 GENERAL

Unilin Thin-R Timber Frame Board when installed in accordance with this Detail Sheet, is effective in reducing the U-value (thermal transmittance) of timber frame construction.

Buildings subject to the relevant requirements of the Irish Building Regulations should be constructed in accordance with BS 5628-2:1991 *Structural use of timber – Code of practice for permissible stress design, materials and workmanship* and BS 5628-6.1:1988 *Structural use of timber – Code of practice for timber frame walls – Dwellings not exceeding three storeys*, as appropriate. As with all types of wall insulation, the construction detailing should comply with good practice.

3.2 CE MARKING

The manufacturer has taken the responsibility of CE marking the products in accordance with harmonised standard I.S. EN 13165:2012+A2:2016, Thermal insulation products for buildings - Factory made rigid polyurethane foam (PU) products - Specification. An asterisk (*) appearing in this Certificate indicates that data shown is given in the manufacturer's Declaration of Performance. Reference should be made to the latest version of the manufactures DoP for current information on any essential characteristics declared by the manufacturer.

Public

4.1 BEHAVIOUR IN FIRE

Unilin Thin-R Timber Frame Board of itself has a Euroclass F reaction to fire classification per I.S. EN 13501-1:2018, as per the test report submitted. The plasterboard used to cover the product is deemed to be Class O in accordance with the Irish Building Regulations. Timber frame constructions that are to include the use of the Unilin Thin-R Timber Frame Board must fully comply with the requirements of I.S 440: 2009 +A1:2014 and the fire resistance requirements of TGD B Vol 2 2017 Appendix A and TGD B 2006 Appendix A to Part B of the Irish Building Regulations. The insulation component of the board should be isolated from possible sources of combustion. To achieve this, Unilin Thin-R Timber Frame Board should be installed in accordance with the following:

- Unilin Thin-R Timber Frame Board should be separated by a minimum distance of 150mm from an oil, solid fuel or gas heating appliance as indicated in Diagram 8 of TGD to Part J of the Irish Building Regulations.
- Unilin Thin-R Timber Frame Board when installed with a residual cavity between the board and the wall, will require the provision of cavity barriers and may be used in buildings of any purpose group provided:
  (a) Cavity barriers in walls are provided at maximum distances apart of 10m unless a Class 1 material is exposed to the cavity when a spacing of 20m may be adopted.
  (b) Every such cavity shall be closed by a cavity barrier around the whole perimeter of the wall or ceiling element and around the perimeter of any opening through such elements.
  (c) Cavity barriers in spaces between a floor and ceiling are provided at maximum distances of 20m for any class of surface exposed to the cavity.
  (d) Where any wall or ceiling containing a cavity meets another such element, the cavities shall be closed so that they do not communicate with one another.
  Direction on the provision and spacing of cavity barriers is given in Tables 3.2 and 3.3 of TGD to Part B of the Irish Building Regulations.

Combustible wall insulation material shall generally 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. Particular details are given in Section 2 and Diagrams 2 – 8 of TGD to Part J of the Irish Building Regulations. It should also be separated by 40mm from the external surface of a masonry chimney. For chimneys covered by BS 4543-1:1996 *Factory made insulated chimneys*, separation between this product and the external surface of the chimney shall be determined in accordance with Clause 2.17 of TGD to Part J of the Irish Building Regulations.

4.2 WATER PENETRATION

Capillary Action – The closed cell structure does not allow water uptake by capillary action.
Unilin Thin-R Timber Frame Board, when used in accordance with this Detail Sheet, presents no significant risk of water penetration.

4.3 WATER VAPOUR PENETRATION AND CONDENSATION RISK

Unilin Thin-R Timber Frame Board has a vapour resistivity exceeding 100MNs/g. It has a significant resistance to the passage of water vapour. This obviates the risk of surface condensation and presents no significant risk of damage from interstitial condensation. However as in normal practice the insulation should not be regarded as a vapour barrier unless the joints between adjoining Unilin Thin-R Timber Frame Boards are sealed with aluminium foil tape to the 'warm' side of the board.

4.4 THERMAL INSULATION

The aged thermal conductivity '$\lambda_{90/90}$' value of Unilin Thin-R Timber Frame Board, when measured in accordance with IS EN 12667:2001, and calculated in accordance with Annex C of I.S. EN 13165:2012 is 0.022* W/m.K. The required maximum U-values for timber frame walls can be obtained with Unilin Thin-R Timber Frame Board constructions as indicated in Table 3.

4.5 DURABILITY

Unilin Thin-R Timber Frame Boards are rot proof and durable. Unilin Thin-R Timber Frame 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.

4.6 SERVICES

The maximum continuous working temperature of PIR is 100°C. Where heating systems are to be used, the advice of the Certificate holder is to be sought.

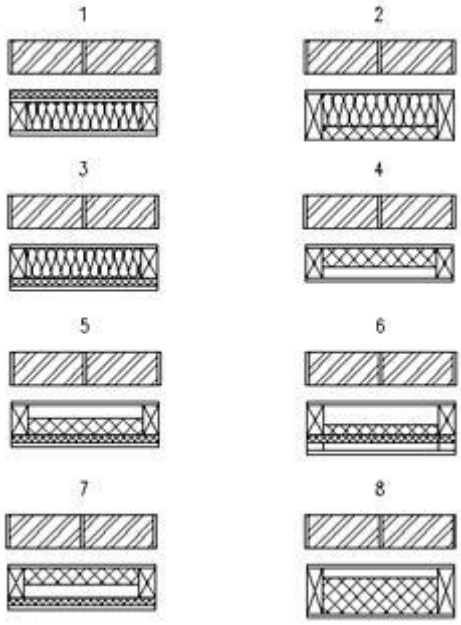
Property	Declared Value	Test Method
Reaction to Fire	NPD*	EN 13501
Dimensional Stability	DS(70,90)4*	EN 1604
Density	32 kg/m^3	EN 1602
Compressive Strength	CS (10/Y) 140*	EN 826
Thermal Conductivity	0.022* W/mK	EN 12667
Thermal Resistance - 20 mm - 25 mm - 30 mm - 35 mm - 40 mm - 45 mm - 50 mm - 55 mm - 60 mm - 65 mm - 70 mm - 75 mm	 0.91 m^{2}K/W 1.14 m^{2}K/W 1.37 m^{2}K/W 1.60 m^{2}K/W 1.83 m^{2}K/W 2.06 m^{2}K/W 2.28 m^{2}K/W 2.51 m^{2}K/W 2.74 m^{2}K/W 2.97 m^{2}K/W 3.20 m^{2}K/W 3.43 m^{2}K/W	

Table 2: Physical Properties of Unilin Thin-R Timber Frame Board

	Stud Size (mm)	External Wall	Polyiso in Cavity (mm)	Between Studs (mm) Polyiso XT/TF	Between Studs (mm) Liner (mm)	Thermal Mineral Fibre	U Value (W/m^{2}K)
1	89	Brick/concrete	25	-	-	89	0.26
2	140	Brick/concrete	-	40	-	100 (HD)	0.25
3	89	Brick/concrete	-	-	25	89	0.25
4	89	Brick/concrete	-	55	-	-	0.36
5	89	Brick/concrete	-	50	25	-	0.27
6	89	Brick/concrete	-	30	25*	-	0.27
7	89	Brick/concrete	-	50	25	-	0.26
8	140	Brick/concrete	-	110	-	-	0.27

Note: 25mm battens fixed over Thermal Liner and under Drylining to provide Service Duct.
Timber stud area taken as 15%.

Table 3: Timber Frame Wall Constructions – Typical U-values



Public