THE SELF-BUILD GUIDE

Achieve a practical & affordable energy efficient home

WHEN SELF BUILD BECOMES A TEAM EFFORT

UNILIN INSULATION

Dun Laoghaire Passive Build @DlRArchitects
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UNILIN INSULATION

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With you when building your energy efficient home

FREE
One-to-one advice
for self builders

Traditionally when you made the decision to build your own home the question of 'How energy efficient should it be?' was up there with 'What size? How many bedrooms? What finishes will I choose?'

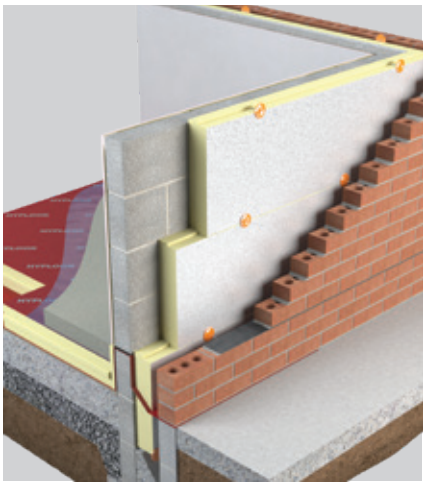
As regulations move towards Nearly Zero Energy Buildings and Passive levels, the question of efficiency has largely become mandatory. Lets face it, those building their own homes want the best achievable. Your house will be greener, it will be cheaper to heat the space, the hot water and cheaper to light. However how you achieve this efficiency raises more questions... How do I get there?

This guide gives honest, practical solutions to achieving an energy efficient low carbon home that works for your family.

This is most likely your biggest ever investment, you only get one chance at getting the insulation correct.

Insulation, just 'sits there' and quietly reduces energy consumption and running costs throughout the building's life. However energy performance can be affected if your insulation is installed incorrectly. For this reason Unilin have developed insulation systems to ensure that all the critical areas are properly insulated.

Here we set out the main issues in getting it right first time and explain how we at Unilin can play our part in making your self build project a success.



Insulate Right. Ventilate Right.

Of all sectors of the construction market, the self builder is the single most focused customer that Unilin encounters. It's your project, your dream and your investment, you have to care.

You, the Self Builder, know the importance of research, learning and becoming your own expert. There are many methodologies on low energy build and any amount of advisors willing to advise. Ultimately it is you that will settle on an energy standard and construction specification that suits you and your family and that is how it should be.

You understand the importance of getting your insulation right - the team at Unilin are here to help and advise.

See how the Unilin Platinum Service for Self Build can assist you and your installers to understand the critical issues of insulation performance and with the assistance of Unilin get it right...

When Self Build Becomes a Team Effort.

What targets should you aim for?

NEARLY ZERO

Whether NZEB or Passive levels the insulation performance targets of the building fabric, i.e. walls, floors, roof and openings are becoming standardised. Walls, around a U-Value of 0.15 W/m^{2}K, floors around 0.12 W/m^{2}K and roof around 0.14 W/m^{2}K. Glazing will always be colder at somewhere between 0.80 - 1.4 W/m^{2}K.

As with most issues - 'reasonable' works. There is a law of diminishing returns when it come to U-Values. Pushing cavities to unreasonable widths that require more and greater wall ties, with ever increasing foundations, has little benefit in terms of energy savings but does have impact on the embodied carbon content of the building.

See the Unilin Report on Embodied Carbon here.

However Part L Guidance does allow U-Values to be relaxed to 'Back stop' or worst allowable levels. This reduction in performance can be compensated for by adding more technologies; but there are consequences - not least you lose more heat!

Table 2 illustrates the impact of reducing U-Values to these minimum allowed levels.

Detached: Self Build

In table 1, we have achieved compliance by using 150mm CavityTherm and 150mm Hyfloor using calculated Y-Values for the building fabric in combination with a heat pump to satisfy the renewable contribution. (Y-values in essence measures the effectiveness of good insulation installation following good details for junctions in the construction - see Page 8.

In table 2, keeping the house specification identical, but reducing the U-Values to minimum 'backstop' levels and using uncalculated default Y-Values results in a non-compliant house that loses more energy when compensation is made by adding renewable technologies to achieve compliance.

PASS

Table 1. Improved insulation

Item	U-Value	Specification
Floor Insulation	0.11	150mm Unilin Hyfloor
Cavity Wall	0.13	150mm CavityTherm
Ceiling	0.12	300mm Fibreglass & 42.5mm Thermal Liner Mechanically Fixed
Windows	1.40	Double Glazed
Front Door	1.00	Insulated door (To be confirmed by supplier)
Back door	1.50	(To be confirmed by supplier)
Heating system	Yes	Heat pump - 268% Space heating 233% water heating
Heating controls	Yes	Full time and temperature controls
Light Fittings %	100%	CFL low energy lights
Thermal Bridging Factor	0.02	Calculated using Unilin details
Air Permeability	5	0.25 ACH
Renewable Technology	Yes	From heat pump
Natural Ventilation	Yes	
Secondary Heating	Yes	Log burner stove
Delay Start Stat	N/A	
Cylinder	300L	Cylinder factory insulated 100mm

Results	EPC	CPC	RER
A2 Rating	0.280	0.226	45%
Maximum permitted performance for EPC and CPC	0.300	0.350	20%

FAIL

Table 2. Backstop Values

Item	U-Value	Specification
Floor Insulation	0.15	125mm PIR
Cavity Wall	0.18	100mm PIR
Ceiling	0.16	300mm Fibreglass
Windows	1.40	Double Glazed
Front Door	1.40	Standard door
Back door	1.40	Standard door
Heating system	Yes	Heat pump - 222% Space heating 233% water heating
Heating controls	Yes	Full time and temperature controls
Light Fittings %	100%	CFL low energy lights
Thermal Bridging Factor	0.08	Default Y-value when using ACDs
Air Permeability	5	0.25 ACH
Renewable Technology	Yes	From heat pump
Natural Ventilation	Yes	
Secondary Heating	Yes	Log burner stove
Delay Start Stat	N/A	
Cylinder	300L	Cylinder factory insulated 100mm

Results	EPC	CPC	RER
A2 Rating	0.403	0.327	41%
Maximum permitted performance for EPC and CPC	0.300	0.350	20%

Thermal Bridging
The difference is in the detail

Like all other inputs into a building energy calculation, the way that insulation is installed to avoid thermal bridging has a numerical input into the software which is called a Y-Value. Better detailing delivers energy savings beyond a simple U-Value improvement.

A set of 'good practice' details have been available in the form of 'Acceptable Construction Details' (ACDs) published by the Department of Housing in Ireland. These details are a set of design drawings for the junctions listed in Table D1-D6 of Part L which are most prone to heat loss. They detail, using traditionally used construction methods and materials, how insulation should be installed at these critical junctions in order to improve not only the heat loss but also airtightness results. This also helps reduce the risk of condensation by ensuring surface temperatures are within a safe margin.

What is Thermal Bridging?
Thermal bridging occurs in small areas where the insulation level is reduced significantly compared with the remainder of the element. They may be 'Repeating,' 'Random,' or 'Non-Repeating.'

Where does Non-Repeating occur?
Non-repeating thermal bridges typically occur at the junctions between plane building elements, e.g. at wall/roof, wall/floor junctions, and around openings, e.g. at window jambs, sills and also corners where the continuity of the insulation is interrupted.

How is it accounted for?
Thermal bridges are calculated as a linear thermal transmittance value - PSI (Ψ) measured in W/mK. DEAP is the software that is used to calculate a dwellings BER rating. Within DEAP Thermal bridging through junctions are accounted for as a 'Y-Value.'

Are all junctions accounted for within DEAP?
No. The major critical junctions are those that account for the majority of the heat loss. However reasonable care should be taken to insulate all bridges that occur onsite to avoid condensation.

Y = 0.15

(DEAP Default)

The equivalent of an open 'Garage Door' 2.1m x 3.3m (6.93m²) opening.

Y = 0.08

(Acceptable Details)

The equivalent of an open 'Patio Door' 2.1m x 1.8m (3.78m²) opening.

Y = 0.03

(Thermally Modelled Junctions)

The equivalent of an open 'Window' 1.25m x 1.25m (1.56m²) opening.

Prioritising the Fabric First Approach

There is a range of compliance options available to the Designer or Specifier. The Fabric First approach concentrates on achieving U-Values and Thermal Bridging detailing improvements towards Passive levels. These measures might be less dynamic than mechanical ventilation systems or additional renewable technologies, but you only get one chance at getting the insulation correct. Insulation just 'sits there' and quietly reduces energy consumption and reduces the running costs. Any technologies, ventilation systems, heating systems even double glazing has a life span.

Improvements in U-Values to around 0.15 W/m^{2}K as illustrated, with better detailing on site to improve thermal bridging 'Y-Values' towards 0.04 simply stops heat loss. The Unilin solutions illustrated later in this publication follow the same reasoning. Taking the route of improved air permeability lower than 5 m^3/m^{2}h @ 50 Pa, to increase the contribution from renewable energy technologies (i.e. RER ≥ 0.20), will rely on technologies to deliver energy savings. Specification, installation and maintenance of all these systems will be crucial for long term effectiveness. The better the building fabric into which these technologies are placed, improves their performance.

For a comprehensive specification choice for the self builder please refer to page 16 of this Guide.

The consequences for reducing fabric performance to minimum standards are illustrated on previous page.

Ventilation Strategy

The Government 'recipes' for compliance limit airtightness to allow for natural ventilation to be used to achieve NZEB. Unilin Insulation have taken the same view. Airtight build requires mechanical ventilation. Ventilation strategies are complicated and must be designed, installed and maintained through their lifetime to ensure healthy operation.

Refer to NHBC Guidance 3.2 - Installing an MVHR system is one way of providing ventilation, with the additional benefit of reducing energy use; however, their in-service performance can be extremely sensitive to relatively minor installation defects. Fundamental to MVHR systems achieving satisfactory in-service performance is to ensure that appropriate standards are followed, not only for the on-site installation but, importantly, right at the start of the construction process – at the design stage.

Secondary Heating

In a number of configurations we have met the NZEB standard while including a wood burning stove. Much like ventilation, heating should reflect the owners preference, many prefer open windows - even in the depths of winter. How we use our properties influences the energy and carbon results.

Specification Choice Questions for Self Build

Traditionally when you made the decision to build your own home the question of 'How energy efficient should it be? was up there with 'What size? How many bedrooms? What finishes will I choose?'

That question of efficiency has largely become mandatory, your house will be greener, it will be cheaper to heat the space, the hot water and cheaper to light. However how you achieve this efficiency raises more questions... How do I get there?

Specification choice for the Self Builder

There is a range of compliance options available to the Designer or Specifier. The Fabric First approach concentrates on achieving U-Values and Thermal Bridging detailing improvements towards Passive levels. These measures might be less dynamic than mechanical ventilation systems or additional renewable technologies, but you only get one chance at getting the insulation correct. Insulation just 'sits there' and quietly reduces energy consumption and lowers running costs.

Other 'technologies', ventilation systems, heating systems even double glazing has a life span and will have to be maintained, repaired or replaced during the life of your home. The following topics are often discussed when our tech guys get into discussion with self builders, our team has extensive experience across a wide range of topics — they're there to help.

Perhaps we can share some of our experience and assist where we can in the planning of your new home.

An air-tight build?

The Government 'recipe' within building guidance reaches NZEB standard with a reasonable air permeability of 5. This allows for natural instead of mechanical ventilation to be used. Pushing air tightness beyond 5 really necessitates the requirement for mechanical whole house ventilation systems which must be designed, installed and maintained professionally – it is not easy to get right.

In many constructions an airtight regime will be necessary to maximise the choice of renewable heating system. Ensure that your Architect and Engineer are fully competent in the design and installation of the mechanical ventilation systems – maintenance is down to you. Careful design will also be required if natural ventilation is chosen to ensure adequate background ventilation is achieved naturally and regulation standards are met. In the UK and Ireland we are blessed with a mild climate where most of us sleep with the windows open, it is a matter of preference.

At an Air Infiltration and Ventilation Symposium in Dublin March 2019 it was illustrated how difficult it is to get the desired performances - www.aivc.org/resources/collection-papers/aivc-publications

Excerpt:
France: Jobert (2012) & Guyot et al. (2015)
1287 new dwellings – 68% had non-compliant ventilation systems.

All of the 21 low-energy houses to Building Regulations 2012 did not comply fully with ventilation requirements:
- 55% due to poor on-site installation
- 43% due to a poor design
- 2% due to inappropriate use maintenance by end user

UK: Zero Carbon Hub (2016)
33 dwellings – 6 sites to Building Regulations 2010. Not one site complied with Building Regulations on ventilation.

UK: AECOM (2016)
2 in 55 new dwellings with NV complied and 1 in 25 new dwellings with MEV complied. Only 16% of MVHR were installed correctly.

Timber frame or traditional block?

Any construction method can achieve NZEB standard or better. The preference is basically down to you. However in all cases, the construction process on site is the single biggest factor in achieving your energy saving goals, our advice is to walk with your Architect and Builder through the whole design and build process right to the end of the contract to ensure delivery of a quality home.

Responsible Builders will ensure detailing standards and quality is achieved through an evidence based record of good detailing as the build progresses allowing accurate calculation by the Energy Assessor and Building Control.

Having your Designer available to give guidance on site will deliver a better quality home.

Is NZEB as far as I can go?

There are many methodologies on low energy build and any amount of advisors willing to advise. NZEB can be improved upon to further cut carbon. Issues of embodied carbon should also be considered.

When building your own home, research, learn and become your own expert and settle on a standard and construction specification that suits you and your family. Many strive to achieve Passive House Standards, the Passive House Association Ireland can offer guidance and advice - **https://phai.ie**

Or the Irish Green Building Council can advise on embodied carbon - **www.igbc.ie**

The SEI published a guide to building Passive housing in Ireland, Passive homes *'Guidelines for the design and construction of passive house dwellings in Ireland'*. It contained a foreword from Dr Wolfgang Feist, the founder of the Passive House Institute in Germany, as well as information specific to the Irish climate for consideration by those interested in Passive House.

Double or Triple Glazing?

Again, NZEB standard has been achieved in the regulation examples by using double glazing which delivers a U-Value of 1.40 W/m²K. Triple glazed windows can achieve 0.80 – but even at this level this excellent glazing is still almost 8 TIMES colder than the wall it is in and it will need replacing eventually.

Consider reducing glazing area, or draw your curtains on those wintry evenings!

Heating Systems - Underfloor Heating, Radiators or Warm Air?

At NZEB levels your house will be very well insulated. So much so that overheating of the property becomes a serious issue in warm weather.

Make sure you can 'flush' the warm air in summer. It also means that incidental heating from cooking and large South facing windows will contribute to the heating. In such situations, many would choose a system that responds rapidly. Recent building regulations have given specific requirements in relation to overheating. Discuss this with your Engineer and again make sure your ventilation choice considers all these factors.

Make sure you can 'flush' the warm air in summer.

Passive Foundation System?

You might be considering a 'Passive' foundation system as part of your strategy to save energy – but how do you know what you're getting for the extra expense? The performance of the floor system is measured in 2 aspects:

Hyfloor Strip Foundation System

1. The U-Value. We recommend around 0.10 - 0.12 W/m²K, around 150mm of insulation.
2. The PSI value, measuring the heat loss at the floor perimeter or edge. A Passive System normally acts as an insulated wrap to the underside of the wall and can get PSI values as low as 0.08, however, so can traditional strip foundation with an Aerated or even Medium Density traditional block. Consider loading capabilities if you're building higher than single storey. Also the effects of water or even contaminants leeching into such systems. Ask for the U-Value and PSI values achieved.

Pumped Cavities or Built-in?

Achieving better performing buildings will take more care and time to build, it will necessitate more careful detailing and consideration from your Architect, but ultimately – you save on heating bills over many many years. No matter where your energy comes from – it will have to be paid for, so reduce your requirement.

Built-in insulation may not be the cheapest option, but the real benefit is that it reaches the same performances at reduced thicknesses saving on other building material costs such as widening cavities, that calls for more wall ties, more engineering consideration, wider foundations and longer rafters.

The real benefit of Unilin insulation products is that you can see it being built in. You can verify it's continuous and is being detailed in footing, corners, openings etc; you can see your investment installed correctly.

It's in the detail - who monitors build quality?

How well your house is insulated is 'scored' in the energy calculation that deems your Energy Rating as A2 or A3. It is not just the U-Value achieved, but how the insulation was installed to create a continuous thermal protection that knits at all the junctions, insulates around openings and protects around DPCs etc. In a well insulated property, discrepancies and gaps in the insulation layer will leave gaps or cold spots that will result in mould growth, particularly in a property where the ventilation is inadequate.

Good detailing to avoid these thermal bridges delivers excellent energy savings and protection from cold spots.

This detailing should be recorded and submitted to the Energy Surveyor to improve your energy rating and give comfort to you the owner. There are a set of Acceptable Construction Details (ACDs) that need to be followed to comply with Building Regulations. Your Builder is the only person that is available throughout the build to inspect and record that the ACDs are followed.

Working closely with the Designer and Unilin, we can deliver energy saving through better detailing, with online courses, toolbox talks and installation videos for your builder to consult.

Wood burning stove or not?

In a number of the examples in our guide to achieving NZEB we have included the provision of a wood burning stove as the source for secondary heating in a property. This may not be practical in an urban environment, but many Self Builders see the addition of a wood burning stove as an important feature of how they heat their home and how they use their home.

Better design and technologies will never mitigate all CO_2 produced from our dwellings, how we use our homes, and the lifestyles we choose is down to ourselves.

Efficient wood burning stoves using kiln dried local timber, might be one of the choices you prefer, it can still help to achieve the NZEB standard.

Platinum Service for Self-builders

FREE
One-to-one advice for self builders

Self-builders and their design and certification team can rely on the expertise and professional support of the whole Unilin team - it is not just about buying insulation products.

Our Platinum Service gives you the highest level of support from design stage to delivery of real performance on site through the assurance of a validation process from calculation to installation.

The Benefits

- Free Consultation Service with project dedicated Unilin Technical expert
- Certified U-Value Calculations/Condensation Risk Analysis
- Prompt response – all project sizes
- Fabric performance specifications to achieve 'A' rated building
- Pre-design Assessment of details & Y-Value performance
- Personal consultation and access to on-line training
- Pre-tender Unilin Insulation spec check

“OUR NEW HOME, OUR FUTURE, WE WANT LOWER FUEL BILLS AND REDUCED CARBON FOOTPRINT - WE WANT TO GET IT RIGHT”

Product Range

CAVITYTHERM
BUILT IN FULL FILL WALL INSULATION

XTROLINER
SUPERIOR PERFORMANCE PIR INSULATION

THIN-R PLUS
ENHANCED PIR INSULATION

WALLS ROOFS FLOORS

Images courtesy of Selfbuild magazine; read about the project on selfbuild.ie

Full range of accessory pieces available to build a continuous system

CAVITYTHERM BUILT IN FULL FILL WALL INSULATION

Full Fill Cavity Walls

CT/PIR

CavityTherm is an innovative, built-in insulation for traditional walls that achieves passive level U-Values as low as 0.13 W/m²K with excellent Thermal Bridging detailing in traditional cavity widths up to 150mm wide.

Benefits

- Engineered HIPs facer provides wind driven rain protection
- Moisture redirected to outer surface
- Prepositioned slots for sloping wall ties - no creep
- Fully engineered jointing - no reliance on taping
- Full range of accessory pieces build continuous system
- Excellent Thermal Bridging values

Specification Clause

The built-in full fill cavity wall insulation shall be CavityTherm CT/PIR manufactured to EN 13165 by Unilin Insulation, including corner boards and ancillary detail components, comprising of a rigid Polyisocyanurate (PIR) core between low emissivity foil facings with engineered HIPS outer skin. The CavityTherm CT/PIR_ _ _mm with an Agrément declared Lambda value of 0.021 W/mK to achieve a U-Value of __ _ _W/m²K for the wall element. To be installed in accordance with instructions issued by Unilin Insulation.

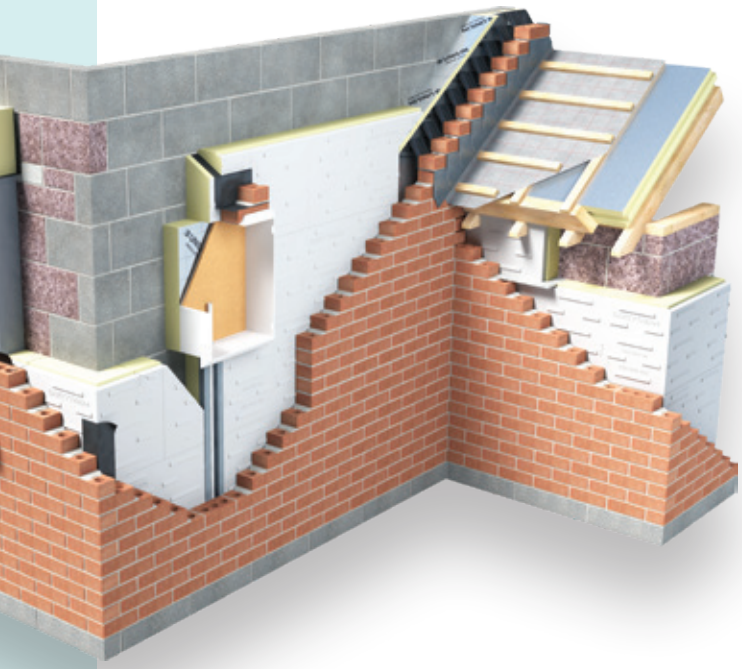
An Environmental Product Declaration (EPD), certified by IGBC is available for this product. Please contact technical support for further details.

Refer to NBS clause F30 150, F30 12.

CT/PIR

Thermal Conductivity	0.021 (W/mK)
Length (mm)	1200
Width (mm)	450
Thickness (mm)	100, 110, 125, 150
Typical R-Value*	4.50, 5.00, 5.70, 6.90

*Overall thickness



THERMAL PERFORMANCE

WALLS

CT/PIR

Typical U-Values

CERTIFICATE CS/nnnn-n
U Value Competency Scheme

Table 1
CavityTherm (Inner block 100)

Build up:

- Plaster
- 100mm Inner Leaf Blockwork
- CT/PIR
- Unventilated Cavity
- 100mm Outer Leaf Blockwork
- 19mm Sand/Cement Render

		Thickness (mm)			
Block Lambda		100mm	110mm	125mm	150mm
	1.13	0.20	0.18	0.16	0.13

Flexible Fleece backing to ensure tight fit against uneven surfaces

CAVITYTHERM FLEX BUILT IN FULL FILL WALL INSULATION

Full Fill Cavity Walls

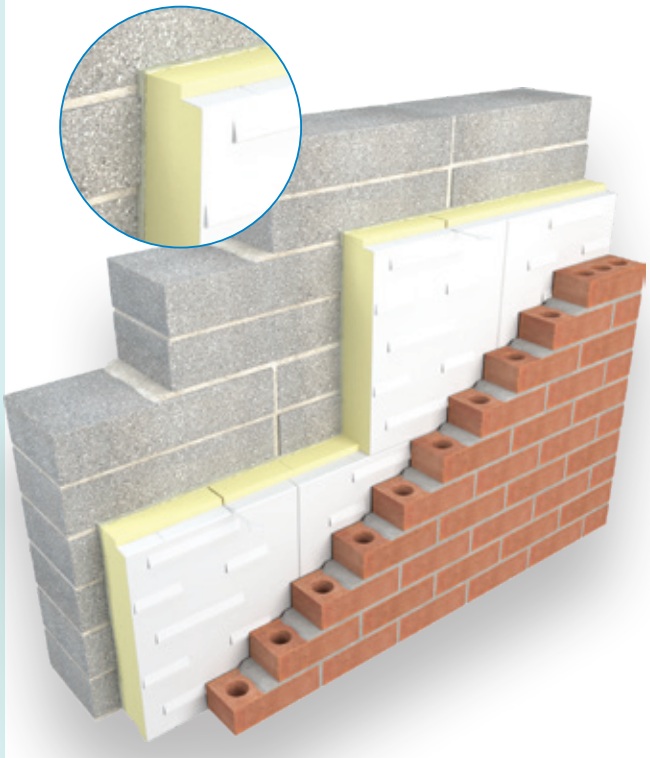
CT/PIR FLEX

CavityTherm Flex is the perfect solution when insulating fair faced inner block walls or when block is laid flat resulting in an uneven surface to accept the insulation. The 25mm flexible fleece absorbs any variations due to block tolerances, providing a continuous, unbroken bond between insulation layer and block. Achieve passive level U-Values as low as 0.14 W/m²K with excellent Thermal Bridging detailing in cavities less than 150mm wide.

Benefits

- Engineered HIPs facer provides wind driven rain protection
- Moisture redirected to outer surface
- Flexible backing to eliminate indentations
- Prepositioned slots for sloping wall ties - no creep
- Fully engineered jointing - no reliance
- on taping*
  Full range of accessory pieces build continuous system
- Excellent Thermal Bridging values

*Where the boards are butt jointed tape is required



Specification Clause

The built-in full fill cavity wall insulation shall be CavityTherm Flex CT/FXPIR manufactured to EN 13165 by Unilin Insulation, including corner boards and ancillary detail components, comprising a rigid Polyisocyanurate (PIR) core between low emissivity foil facings with engineered HIPS outer skin and Flexible backing to eliminate indentations. The CavityTherm Flex_ _ _mm with a Lambda value of 0.021 W/mK to achieve a U-Value of ___ _ _W/m²K for the wall element. To be installed in accordance with instructions issued by Unilin Insulation.

Refer to NBS clause F30 150, F30 12.

NBS Plus

CT/PIR Flex

Thermal Conductivity	0.021 (W/mK)
Length (mm)	1200
Width (mm)	450
Thickness (mm)	125, 150
Typical R-Value*	5.50, 6.70

*Overall thickness

Preformed corners also available with CavityTherm Flex.

THERMAL PERFORMANCE

WALLS

CT/PIR FLEX

Typical U-Values

CERTIFICATE CS/nnnn-n
U Value Competency Scheme

Table 1
CavityTherm Flex (Inner block 100mm)

Build up:

- Plaster
- 100mm Inner Leaf Blockwork
- CT/PIR FLEX
- Unventilated Cavity
- 100mm Outer Leaf Blockwork
- 19mm Sand/Cement Render

	Thickness (mm)	
Block Lambda	125mm	150mm
1.13	0.17	0.14

ACCEPTABLE DETAILING

CT/PIR | CT/PIR Flex

Like all other inputs into a building energy calculation, the way that insulation is installed to avoid Thermal Bridging has a numerical input into the software which is called a Y-Value.

A set of 'good practice' details have been available in the form of 'Acceptable Construction Details' (ACDs) published by the Department of Housing in Ireland. These details are a set of design drawings for the junctions listed in Table D1-D6 of Part L which are most prone to heat loss*. They detail, using traditional construction methods and materials, how insulation should be installed at these critical junctions in order to improve not only the heat loss but also airtightness results. This also helps reduce the risk of condensation by ensuring surface temperatures are within a safe margin.

*Refer to table K1 in the SAP manual for UK

What is Thermal Bridging?
Thermal Bridging occurs in small areas where the insulation level is reduced significantly compared with the remainder of the element. They may be 'Repeating,' 'Random,' or 'Non-Repeating.'

Where does Non-Repeating occur?
Non-repeating thermal bridges typically occur at the junctions between plane building elements, e.g. at wall / roof, wall / floor junctions, and around openings, e.g. at window jambs, sills and also corners where the continuity of the insulation is interrupted.

How is it accounted for?
Thermal bridges are calculated as a linear thermal transmittance value - PSI (Ψ) measured in W/mK. DEAP is the software that is used to calculate a dwellings BER rating (SAP is used in Northern Ireland). Within DEAP Thermal Bridging through junctions are accounted for as a 'Y-Value.'

Are all junctions accounted for within DEAP?
No. The major critical junctions are those that account for the majority of the heat loss. However reasonable care should be taken to insulate all bridges that occur on-site to avoid condensation.

Unilin PSI Values Using Acceptable Details

Using 100mm CavityTherm*

Acceptable Details	Block Type	PSI
1.01a GF	Dense 1.13	0.167
1.01b GF	Med 0.33	0.091
1.01b GF	Light 0.20	0.067
1.23.2 Lintel Close-R	Dense 1.13	0.002
1.23.2 Lintel Close-R	Med 0.33	0.001
1.25 Jamb Close-R	Dense 1.13	0.003
1.25 Jamb Close-R	Med 0.33	0.001
1.26 Sill Forward	Dense 1.13	0.025
1.26 Sill Forward	Med 0.33	0.023
1.27.1 Corner	Dense 1.13	0.050
1.27.1 Corner	Med 0.33	0.042

*Using 100mm CavityTherm. PSI values for other thicknesses can be requested from our technical department.

Using 125mm CavityTherm Flex*

Acceptable Details	Block Type	PSI
1.01a GF	Dense 1.13	0.166
1.01b GF	Med 0.33	0.090
1.01b GF	Light 0.20	0.067
1.23.2 Lintel Close-R	Dense 1.13	0.001
1.23.2 Lintel Close-R	Med 0.33	0.000
1.25 Jamb Close-R	Dense 1.13	0.002
1.25 Jamb Close-R	Med 0.33	0.000
1.26 Sill Forward	Dense 1.13	0.019
1.26 Sill Forward	Med 0.33	0.018
1.27.1 Corner	Dense 1.13	0.048
1.27.1 Corner	Med 0.33	0.040

*Using 125mm CavityTherm Flex. PSI values for other thicknesses can be requested from our technical department.

For full CAD details and Thermal Bridging certificates specifically for Irish constructions visit **www.unilininsulation.ie**

THERMAL BRIDGING

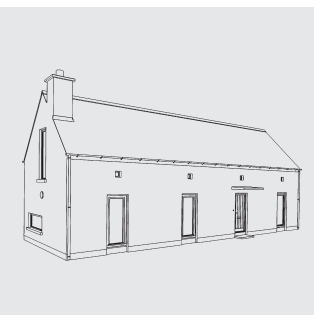
CT/PIR | CT/PIR Flex

CavityTherm is not unique amongst Unilin products in delivering thermal performance beyond simple U-Values.

Below we show a self-build project (simplified to allow junctions to be identified).
Let's look at how the specification needs to be improved to compensate for poor detailing.

	Y-Value 0.03 using Unilin Platinum Service Products range with approved PSI values - within Acceptable Details and calculated	Y-Value of 0.08 based on the use of Acceptable Details but not calculated by the Assessor	No particular detailing specified or witnessed Default value
Y-Value **Details Used**	**0.03** **Unilin certified Psi value**	**0.08** **Acceptable Construction details**	**0.15** **Unspecified / or Witnessed Details**
Front Door	1.5 U value	1.5 U value	1.5 U value
Glazing	1.2 U value	1.2 U value	1.2 U value
Air Permeability	5	5	5
Ventilation	Natural	Natural	Natural
Space Heating Primary	Oil boiler - 92%	Air to Water Heat Pump	Air to Water Heat Pump
Space Heating Secondary	Wood Stove	Wood Stove	Wood Stove
EE Lighting	100%	100%	100%
Renewables	6m² PV	N/A	N/A
Rating	A2	A2	N/A
Energy kWhr/m²/yr	44	40	N/A
EPC (300)	299 **Pass**	284 **Pass**	332 **Fail**
CPC (350)	342 **Pass**	230 **Pass**	267 **Pass**

How the insulation system builds within a construction, how it interconnects at junctions and how it is witnessed and confirmed on site are of equal importance to U-Values. Better U-Values should not be used unless detailing is improved to match those levels.



Engineered jointing for continuity

XTROLINER SUPERIOR PERFORMANCE PIR INSULATION

Partial Fill Cavity Walls

XO/XW

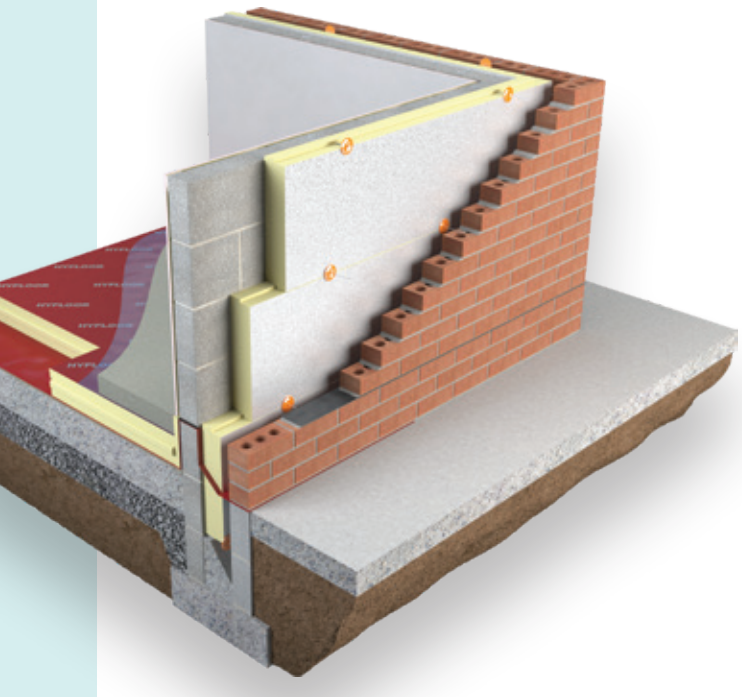
XtroWall is an innovative partial fill wall insulation system incorporating robust facings, engineered jointing details, preformed corners and a certified lambda of 0.021 W/mK.

This lower Lambda improves U-Values and meets Passive House Levels, proving an excellent choice for passive and low energy builds. XtroWall can achieve NZEB Standard in a traditional cavity wall. Building with XtroWall, a residual cavity is maintained, offering excellent protection against wind driven rain.

Benefits

- Engineered jointing
- Corner panels & cavity closers: Reduced Thermal Bridging
- Clear cavity maintained
- Lower lambda value for improved U-Values
- Robust textured foil

SHIPLAP JOINTING



Specification Clause

The partial fill cavity wall insulation shall be XtroLiner XO/XW manufactured to EN 13165 by Unilin Insulation, comprising of a rigid modified Polyisocyanurate (PIR) core with textured robust low emissivity foil facings and engineered shiplap jointing. The XtroLiner XO/XW _ _ _mm with a Agrément declared Lambda value of 0.021 W/mK to achieve a U-Value of __ _ _W/m²K for the wall element. To be installed in accordance with instructions issued by Unilin Insulation.

An Environmental Product Declaration (EPD), certified by IGBC is available for this product. Please contact technical support for further details.

Refer to NBS clause F30 155, F30 12.

Thermal Resistances

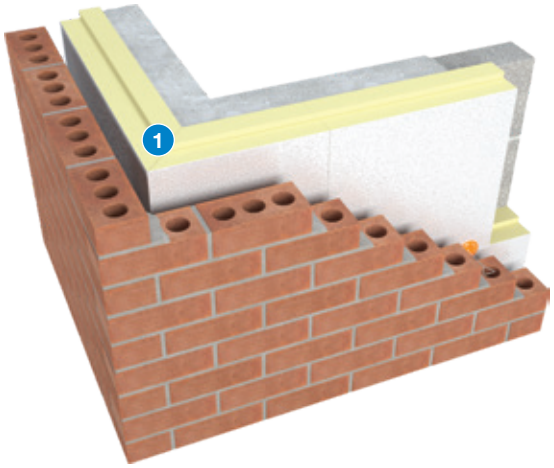
Thickness (mm)	R-Value (m²K/W)
80	3.80
90	4.25
100	4.75

Resistance 'R' Values

The resistance value of any thickness of Unilin insulation can be ascertained by simply dividing the thickness of the material (in metres) by its Agrément declared lambda value, for example: Lambda 0.021 W/mK and thickness 80mm -> 0.080/ 0.021 -> R-Value = 3.80. In accordance with EN 13165, R-Values should be rounded down to the nearest 0.05 (m² K/W).

XO/XW

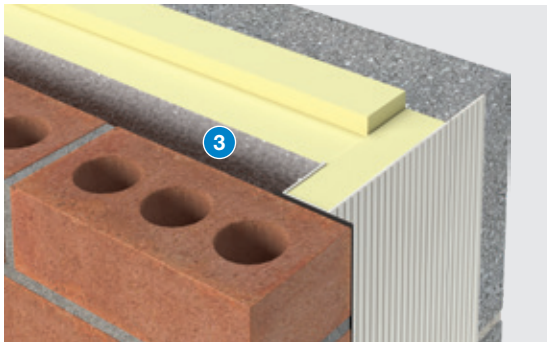
1. The XtroWall Cavity Wall System includes an optional pre-formed corner panel (XO/CRNXW) that folds to 90° to effectively insulate a junction that is normally vulnerable to Thermal Bridging and cold spots.



2. The XtroWall engineered jointing offers a practical on-site solution that results in a more robust continuous layer of insulation, minimising the threat of Thermal Bridging and improving the overall U-Value of the wall.

3. The textured robust low emissivity foil facing on XtroWall improves the thermal performance of the wall. The residual cavity is the most effective method of preventing wind-driven rain penetrating a wall from the outside.

   A residual cavity is the air space that remains when XtroWall is placed against the inner leaf of the cavity of a wall. The recommended residual cavity width required is 40mm in accordance with Irish Building Regulations, however a reduced cavity may be permissible in certain circumstances. A 50mm residual cavity is typically required in Northern Ireland.



XO/XW

Length (mm)	1200
Width (mm)	450
Thickness (mm)	80, 90, 100

Other thicknesses may be available depending on minimum order quantity and lead time.

Property & Units

Thermal Conductivity	0.021 (W/mK)
Compressive Strength	>120 (kPa)
Reaction to Fire	Euroclass C-s2, d0

Unilin CE Declaration of Performance (DoP) for this product is available for download from our website.

THERMAL PERFORMANCE

XO/XW

Typical U-Values

CERTIFICATE CS/nnnn-n
U Value Competency Scheme

Table 1
U-Value calculations to EN ISO:6946
XtroWall Insulation for Partial Fill Cavity Walls

Build up:

- Plaster
- 100mm Inner Leaf Blockwork
- XO/XW
- Low E Unventilated Cavity
- 100mm Outer Leaf Blockwork
- 19mm Sand/Cement Render

Wall ties taken as S/S wire at 3 ties per m^2

Thickness (mm)

Block Lambda	80mm	90mm	100mm
1.13	0.20	0.18	0.17

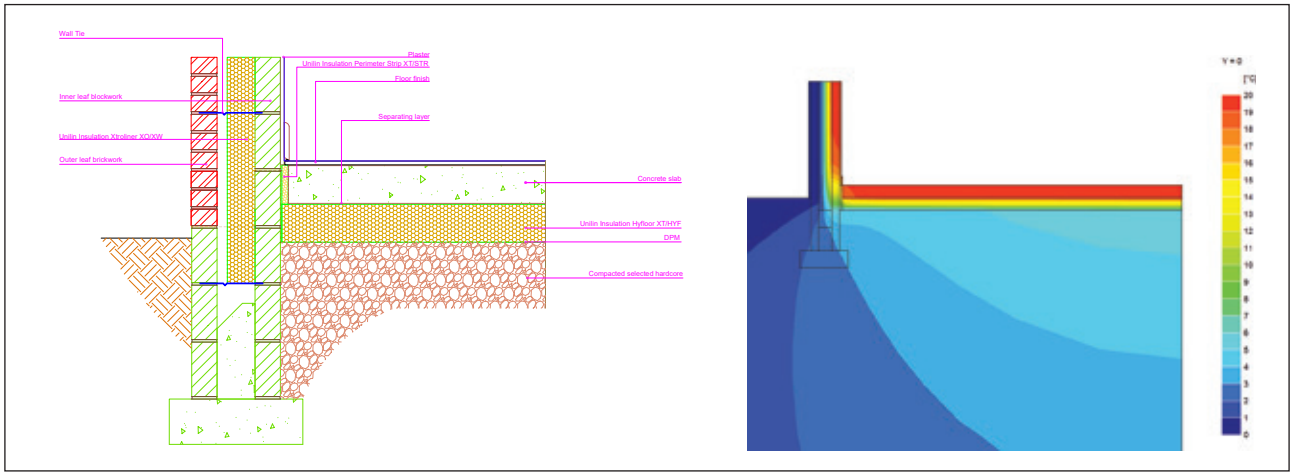
THERMAL BRIDGING

XO/XW

To achieve good detailing, Acceptable Construction Details (ACDs) should be followed during the planning, design and build process.

Unilin Psi Values Using Acceptable Details

Acceptable Details	Block Type	90mm Psi	100mm Psi
1.01a GF	Dense 1.13	0.165	0.165
1.01b GF	Med 0.33	0.089	0.089
1.01b GF	Light 0.20	0.066	0.065
1.23.2 Lintel Close-R	Dense 1.13	0.001	0.003
1.23.2 Lintel Close-R	Med 0.33	0.000	0.002
1.25 Jamb Close-R	Dense 1.13	0.001	0.003
1.25 Jamb Close-R	Med 0.33	0.000	0.001
1.26 Sill Forward	Dense 1.13	0.027	0.027
1.26 Sill Forward	Med 0.33	0.025	0.025
1.27.1 Corner	Dense 1.13	0.048	0.045
1.27.1 Corner	Med 0.33	0.039	0.038



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Visit unilininsulation.ie

Improved Lambda Value 0.020 W/mK

XTROLINER SUPERIOR PERFORMANCE PIR INSULATION

Partial Fill Cavity Walls

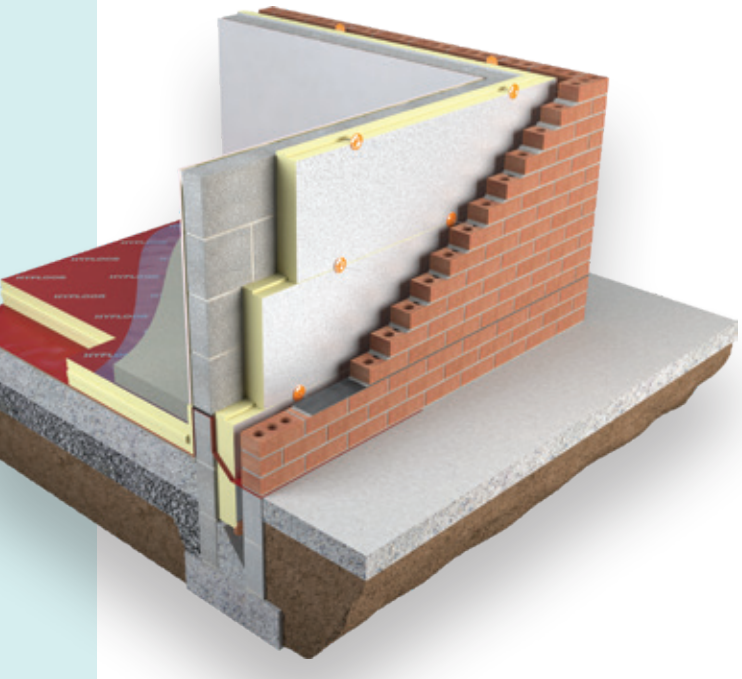
XO/XWP

XtroWall Plus is a superior performance insulation with Agrément declared lambda value of 0.020 W/mK and an enhanced Euroclass C fire classification. It is faced with a robust aluminium foil and is available with engineered jointing to deliver improved Thermal Bridging detailing. This lower Lambda Value improves U-Values and meets NZEB standards, providing an excellent choice for passive and low energy builds. XtroWall Plus achieves a passive U-Value of 0.15 W/m²K in a traditional cavity wall. Building with XtroWall Plus, a residual cavity is maintained, offering excellent protection against wind driven rain.

Benefits

- Achieves 0.15 U-Value in 150mm cavity
- Improved lambda value 0.020 W/mK
- Euroclass C fire classification
- Engineered jointing
- Corner panels & cavity closers: Reduced Thermal Bridging
- Clear cavity maintained

SHIPLAP JOINTING



Specification Clause

The partial fill cavity wall insulation shall be XtroWall Plus XO/XWP manufactured to EN 13165 by Unilin Insulation, comprising of a rigid modified Polyisocyanurate (PIR) core with textured robust low emissivity foil facings and engineered shiplap jointing. The XtroWall Plus _ _ _mm with a declared Lambda value of 0.020 W/mK to achieve a U-Value of 0.15 W/m²K for the wall element. To be installed in accordance with instructions issued by Unilin Insulation.

An Environmental Product Declaration (EPD), certified by IGBC is available for this product. Please contact technical support for further details.

Refer to NBS clause F30 155, F30 12.

Thermal Resistances

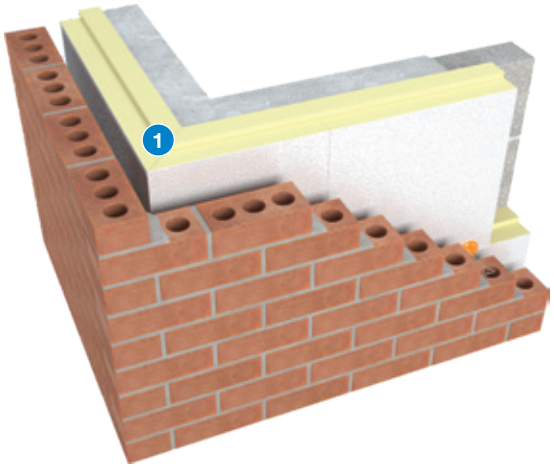
Thickness (mm)	R-Value (m²K/W)
110	5.5

Resistance 'R' Values

The resistance value of any thickness of Unilin insulation can be ascertained by simply dividing the thickness of the material (in metres) by its Agrément declared lambda value, for example: Lambda 0.020 W/mk and thickness 110mm -> 0.110/ 0.020 ->R-Value = 5.5. In accordance with EN 13165, R-Values should be rounded down to the nearest 0.05 (m²K/W).

XO/XWP

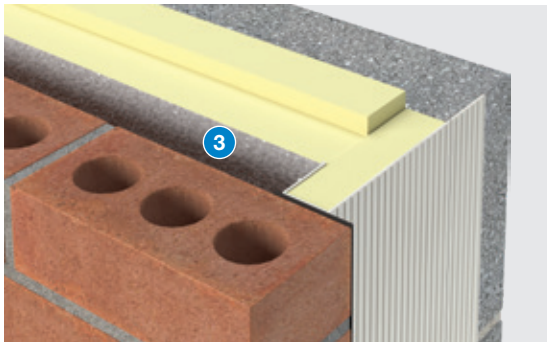
1. The XtroWall Plus Cavity Wall System includes an optional pre-formed corner panel (XO/CRNXWP) that folds to 90 degrees to effectively insulate a junction that is normally vulnerable to Thermal Bridging and cold spots.



2. The XtroWall Plus engineered jointing offers a practical on-site solution that results in a more robust continuous layer of insulation, minimising the threat of Thermal Bridging and improving the overall U-Value of the wall.

3. The textured robust low emissivity foil facing on XtroWall Plus improves the thermal performance of the wall. The residual cavity is the most effective method of preventing wind-driven rain penetrating a wall from the outside.

A residual cavity is the air space that remains when XtroWall Plus is placed against the inner leaf of the cavity of a wall. The recommended residual cavity width required is 40mm in accordance with Irish Building Regulations, however a reduced cavity may be permissible in certain circumstances. A 50mm residual cavity is typically required in Northern Ireland.



XO/XWP

Length (mm)	1200
Width (mm)	450
Thickness (mm)	110

Other thicknesses may be available depending on minimum order quantity and lead time.

Property & Units

Thermal Conductivity	0.020 (W/mK)
Compressive Strength	>120 (kPa)
Reaction to Fire	Euroclass C-s2, d0

Unilin CE Declaration of Performance (DoP) for this product is available for download from our website.

THERMAL PERFORMANCE

XO/XWP

Typical U-Values

CERTIFICATE CS/nnnn-n
U Value Competency Scheme

Table 1
U-Value calculations to EN ISO:6946
XtroWall Plus Insulation for Partial Fill Cavity Walls

Build up:

- 19mm render
- 100mm outer leaf blockwork
- Low emissivity unventilated cavity (0.713 resistance)
- XtroWall Plus cavity wall partial fill PIR insulation
- 100mm inner leaf blockwork
- Plaster finish

Wall ties taken as S/S wire at 3 ties per m^2

Thickness (mm)

Wall Construction	U-Value
Block outer leaf with 100mm dense block inner (plastered)	0.15
Block outer leaf with 215mm dense block inner (plastered)	0.15
Block outer leaf with 215mm dense block inner (fair faced)	0.15
Block outer leaf with 215mm Hollow block inner (plastered)	0.15
Brick outer leaf with 100mm dense block inner (plastered)	0.15

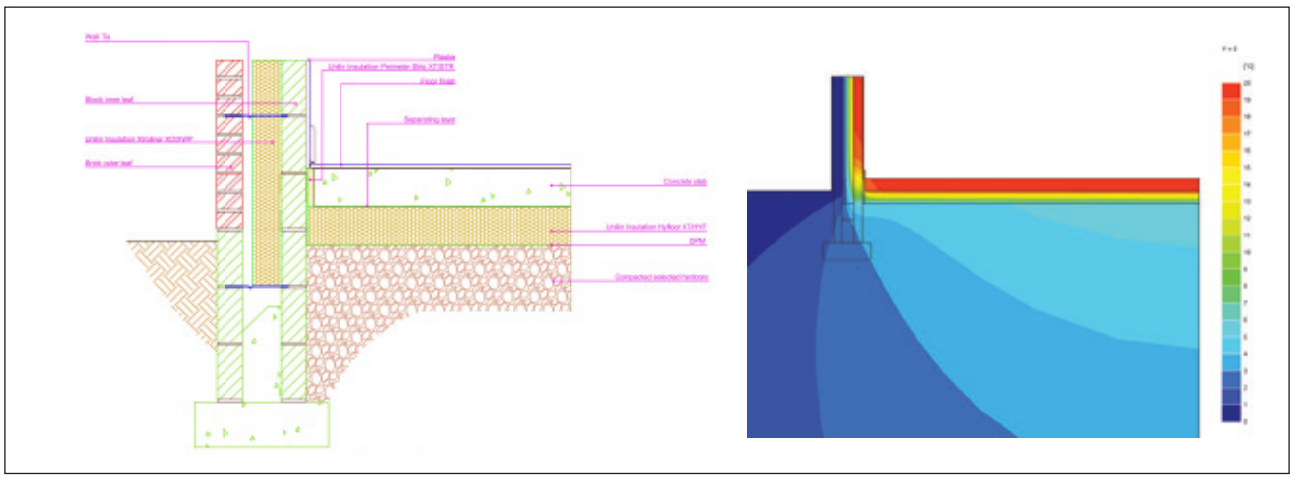
THERMAL BRIDGING

XO/XWP

To achieve good detailing, Acceptable Construction Details (ACDs) should be followed during the planning, design and build process.

Unilin Psi Values Using Acceptable Details

Accredited Details	Block Type	110mm (Psi)
1.01a GF	Dense 1.13	0.165
1.01b GF	Med 0.33	0.088
1.01b GF	Light 0.20	0.061
1.23.2 Lintel Close-R	Dense 1.13	0.004
1.23.2 Lintel Close-R	Med 0.33	0.003
1.25 Jamb Close-R	Dense 1.13	0.003
1.25 Jamb Close-R	Med 0.33	0.002
1.26 Sill Forward	Dense 1.13	0.025
1.26 Sill Forward	Med 0.33	0.024
1.27.1 Corner	Dense 1.13	0.043
1.27.1 Corner	Med 0.33	0.036



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Visit unilininsulation.ie

Most effective insulation for sloped roofs reducing thermal bridging

XTROLINER SUPERIOR PERFORMANCE PIR INSULATION

Sarking Warm Roof Construction

XO/SK (T&G)

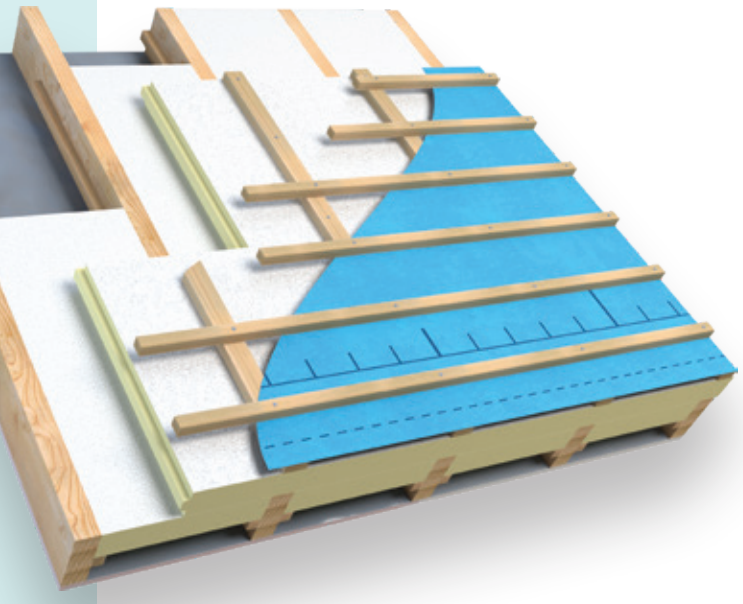
XtroLiner Sarking (T&G) is an engineered tongue and grooved external roof insulation system with robust facings which meets the passive U-Value of 0.15 W/m²K. Using this product improves detailing, speeds up the installation process and provides a uniform plane to detail more effectively.

Creating a warm roof reduces the normal amount of junctions prone to Thermal Bridging, greatly improving the thermal performance of the roof.

Benefits

- Robust tongue & groove jointing
- Reduced risk of condensation
- Avoids intrusion into living area
- Excellent U-Value in roofs
- Reduced Thermal Bridging

TONGUE & GROOVE JOINTING



Specification Clause

The pitched roof Sarking insulation shall be XtroLiner XO/SK manufactured to EN 13165 by Unilin Insulation, comprising of a rigid modified Polyisocyanurate (PIR) core with textured robust low emissivity foil facings and engineered T&G jointing. The XtroLiner XO/SK_ _ _mm with a Lambda value of 0.021 W/mK to achieve a U-Value of ___ _ _W/m²K for the roof element. To be installed in accordance with instructions issued by Unilin Insulation.

An Environmental Product Declaration (EPD), certified by IGBC is available for this product. Please contact technical support for further details.

Refer to NBS clause P10 140, K11 695, K11 55.

Thermal Resistances

Thickness (mm)	R-Value (m²K/W)
50	2.35
75	3.55
100	4.75
125	5.95

Resistance ‘R’ Values

The resistance value of any thickness of Unilin insulation can be ascertained by simply dividing the thickness of the material (in metres) by its lambda value, for example: Lambda 0.021 W/mK and thickness 125mm -> 0.125/ 0.021 -> R-Value = 5.95. In accordance with EN 13165, R-Values should be rounded down to the nearest 0.05 (m²K/W).

XO/SK (T&G)

1. The XtroLiner Sarking tongue and groove jointing offers a practical, on-site solution that results in a more robust continuous layer of insulation, minimising the threat of Thermal Bridging and improving the overall U-Value of the roof.

2. Detailing with breather membranes and vapour control membranes can be more accurately achieved with insulation in a single plane.

Note:
Adding an additional layer of Unilin XO/PR between the counter battens minimises fixing length and improves the overall U-Value of the roof.

XO/SK (T&G)

Length (mm)	2400
Width (mm)	1200
Thickness (mm)	50, 75, 100, 125

Other thicknesses may be available depending on minimum order quantity and lead time.

Property & Units

Thermal Conductivity	0.021 (W/mK)
Compressive Strength	>150 (kPa)
Reaction to Fire	Euroclass C-s2, d0

Unilin CE Declaration of Performance (DoP) for this product is available for download from our website.

THERMAL PERFORMANCE

XO/SK (T&G)

Typical U-Values

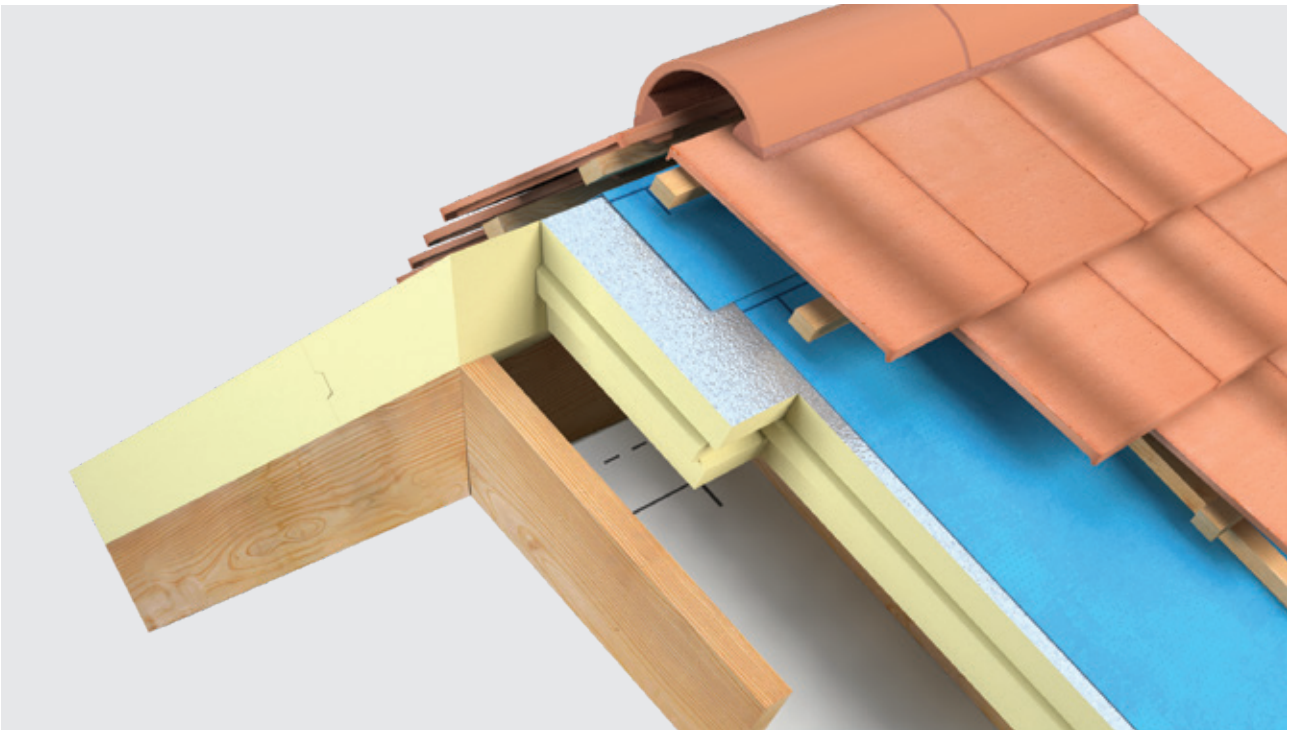
CERTIFICATE CS/nnnn-n
U Value Competency Scheme

Table 1
U-Value calculations to EN ISO:6946
XO/SK (T&G) Insulation for Sarking Warm Roof Construction

Warm Roof build up:

- Tiles
- Battens
- Breather membrane
- XO/SK over rafters
- XO/PR between rafters
- Air layer between rafters
- Vapour control layer
- Plasterboard
- Plaster skim

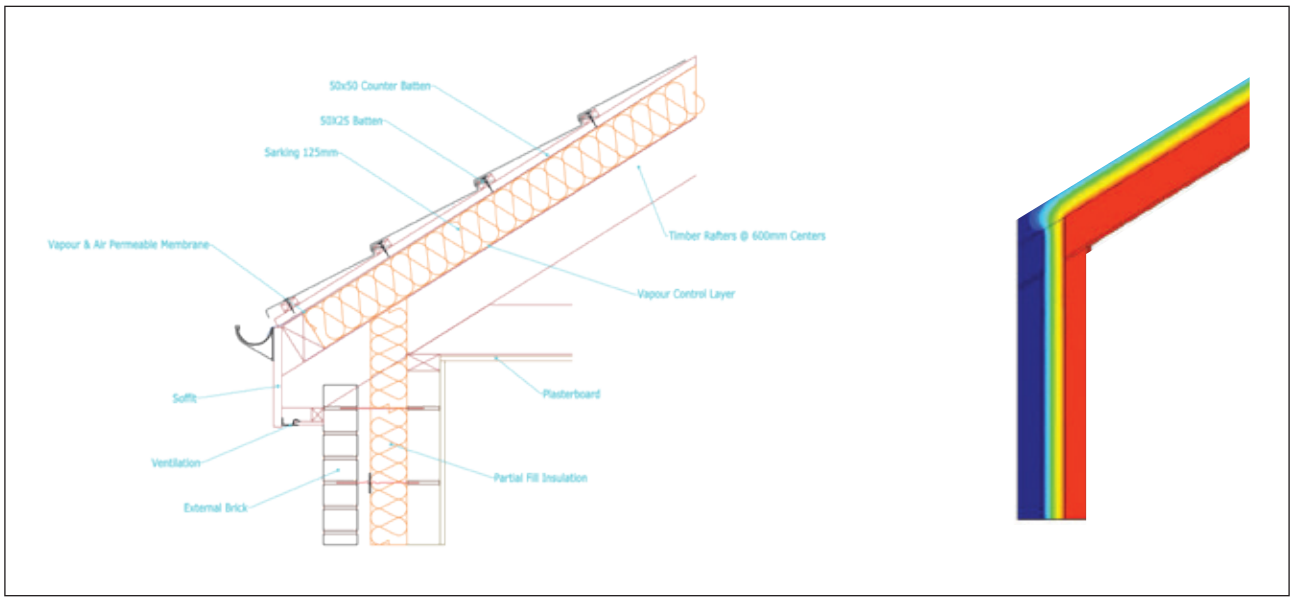
Over	Between	600mm	400mm
100mm	50mm	0.14	0.14
75mm	75mm	0.14	0.15
100mm	-	0.18	0.18
125mm	-	0.15	0.15
100mm	100mm	0.12	0.11



THERMAL BRIDGING

XO/SK (T&G)

To achieve good detailing, Acceptable Construction Details (ACDs) should be followed during the planning, design and build process.



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Visit unilininsulation.ie

Reduces intrusion into living area

XTROLINER SUPERIOR PERFORMANCE PIR INSULATION

Pitched Roofs

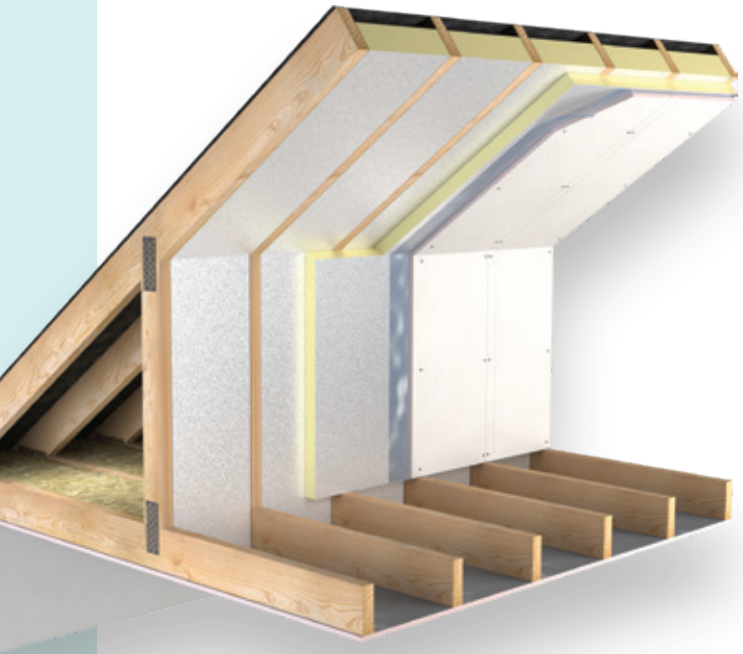
XO/PR

XtroLiner Pitched Roof on sloped roofs (ventilated, hybrid or warm) provides the most efficient U-Values with minimal intrusion into valuable living space. The roof construction is a critical element in the building fabric and is an area at high risk of heat loss. Using XtroLiner Pitched Roof will reduce heat loss while also delivering excellent Thermal Bridging details.

Warm Roof construction is a particularly effective way of insulating complex roofs. Insulating above - or above and between - the roof timbers ensures that the structure is kept at or near the internal environmental conditions, reducing thermal stress and condensation risk.

Benefits

- Reduces intrusion into living area
- Reduced risk of condensation
- Robust foil facings
- Lightweight and easy to install
- Reduced Thermal Bridging



Specification Clause

The pitched roof insulation shall be XtroLiner XO/PR manufactured to EN 13165 by Unilin Insulation, comprising of a rigid modified Polyisocyanurate (PIR) core with textured low emissivity foil facings. The XtroLiner XO/PR _ _ _mm with a Agrément declared Lambda value of 0.021 W/mK to achieve a U-Value of ___ _ _W/m²K for the roof element. To be installed in accordance with instructions issued by Unilin Insulation.

An Environmental Product Declaration (EPD), certified by IGBC is available for this product. Please contact technical support for further details.

Refer to NBS clause P10 140, K11 695, K11 55.

Thermal Resistances

Thickness (mm)	R-Value (m²K/W)
25	1.15
40	1.90
50	2.35
60	2.85
70	3.30
75	3.55
80	3.80
100	4.75
120	5.70

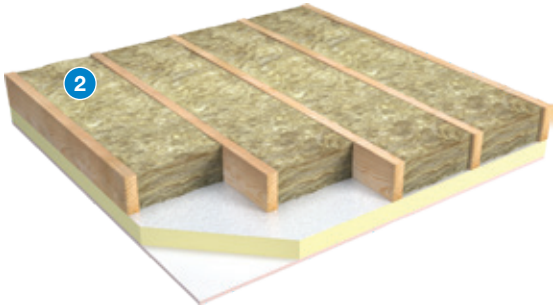
Resistance 'R' Values

The resistance value of any thickness of Unilin insulation can be ascertained by simply dividing the thickness of the material (in metres) by its Agrément declared lambda value, for example: Lambda 0.021 W/mK and thickness 125mm -> 0.125/ 0.021 -> R-Value = 5.95. In accordance with EN 13165, R-Values should be rounded down to the nearest 0.05 (m²K/W).

XO/PR

1. In a conventional ventilated roof a 50mm clear ventilation gap should be maintained between the insulation and the roofing felt. In certain instances where a breather membrane is used instead of standard roofing felt, the ventilation gap may be dispensed with. Refer to manufacturer's guidelines.

2. In a ceiling, typically fibre glass is placed between and over the joists – this hides the top of the joist and may lead to health and safety concerns when the roof space is being accessed. The thermal bridge which occurs through the joists can be addressed by placing a layer of XtroLiner Pitched Roof to the underside, before the plasterboard is fixed. Alternatively Unilin Thin-R Thermal Liner Drylining boards can be fixed to the joists. This allows for the roof space to be accessed in a safe manner leaving the top of the joists exposed, which allows the roof space to be used for storage.



Note

Alternatively, a layer of insulation - covered with chipboard or OSB board - can also be placed over the joists. Unilin Walk-R offers a ready made solution for this application. Please see Unilin Loft Walk-R brochure.

NOTE

In every roof space where there are cold water tanks or services, for H&S reasons the Contractor should construct a permanent boarded walkway to access services. This walkway should be supported above the first layer of insulation to prevent any compaction of insulation below the walkway.

XO/PR

Length (mm)	2400
Width (mm)	1200
Thickness (mm)	25, 40, 50, 60, 70, 75, 80, 100, 120

Other thicknesses may be available depending on minimum order quantity and lead time.

Property & Units

Thermal Conductivity	0.021 (W/mK)
Compressive Strength	>150 (kPa)
Reaction to Fire	Euroclass C-s2, d0

Unilin CE Declaration of Performance (DoP) for this product is available for download from our website.

THERMAL PERFORMANCE

XO/PR

Typical U-Values

CERTIFICATE CS/nnnn-n
U Value Competency Scheme

Table 1
U-Value calculations to EN ISO:6946
XO/PR Insulation for Pitched Roof

Hybrid Roof build up:

- Tiles
- Battens
- Breather membrane
- Air layer between rafters
- XO/PR between rafters
- XO/PR below rafters
- Vapour control layer
- Plasterboard
- Plaster skim

XtroLiner Thickness		Rafter Centres	
Between	**Under**	**600mm**	**400mm**
100mm	40mm	0.16	0.17
100mm	50mm	0.15	0.15
120mm	40mm	0.14	0.15
120mm	50mm	0.13	0.14
100mm	70mm	0.13	0.13
120mm	70mm	0.12	0.12

*Insulation thickness only

Table 2
U-Value calculations to EN ISO:6946
XO/PR Insulation for Pitched Roof

Warm Roof build up:

- Tiles
- Battens
- Breather membrane
- XO/PR over rafters
- XO/PR between rafters
- Air layer between rafters
- Vapour control layer
- Plasterboard
- Plaster skim

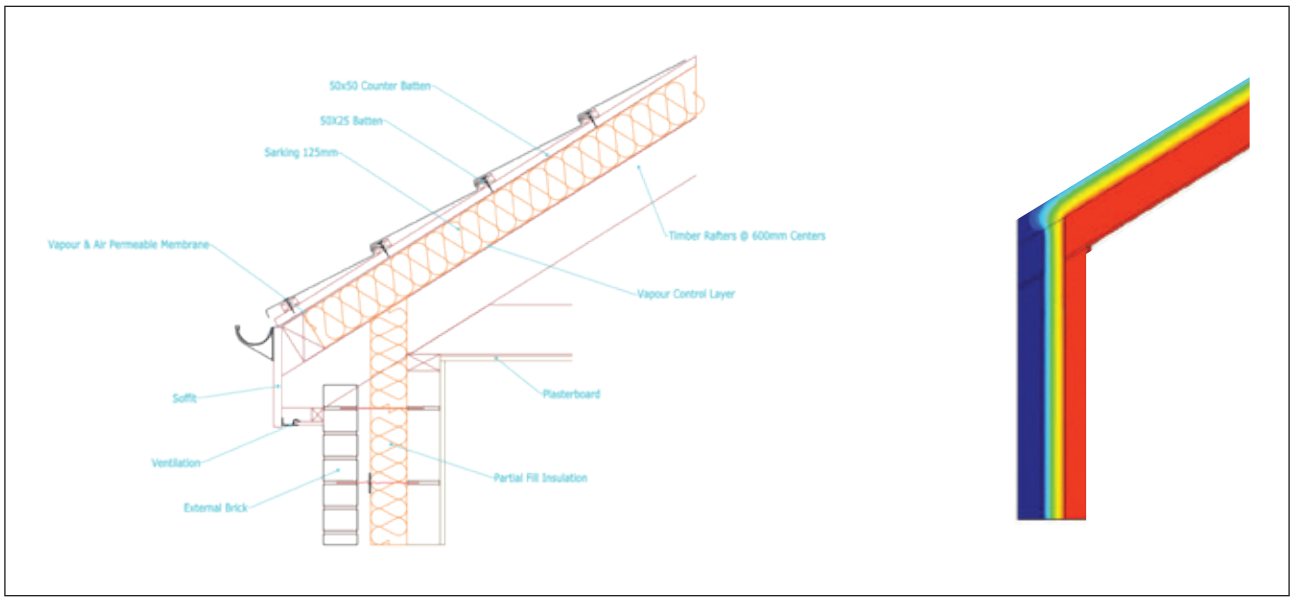
XtroLiner Thickness		Rafter Centres	
Over	**Between**	**600mm**	**400mm**
100mm	50mm	0.14	0.14
70mm	70mm	0.16	0.15
80mm	80mm	0.14	0.14
100mm	60mm	0.13	0.14
100mm	70mm	0.13	0.13
120mm	50mm	0.12	0.13
120mm	-	0.16	0.16

*Insulation thickness only

THERMAL BRIDGING

XO/PR

To achieve good detailing, Acceptable Construction Details (ACDs) should be followed during the planning, design and build process.



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Visit unilininsulation.ie

Thinnest insulation with excellent Thermal Bridging performance

THIN-R PLUS ENHANCED PIR INSULATION

Ground Supported & Suspended Floors

XT/HYF (T&G)

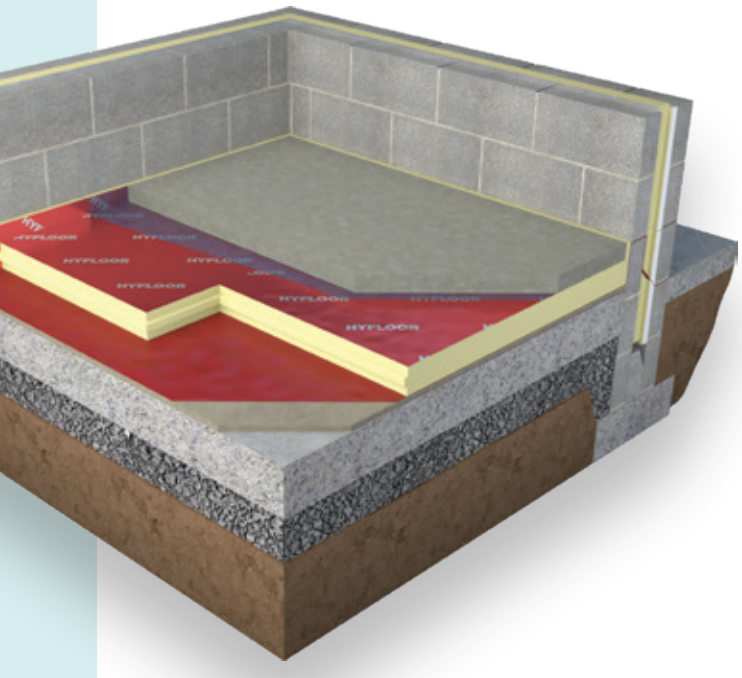
The floor in any building is an area of considerable downward heat loss when not properly insulated. Unilin has developed **Hyfloor (T&G)** engineered tongue and grooved floor insulation as the answer to achieve lower U-Values – in a practical and robust manner.

Hyfloor (T&G) has a superior thickness to performance ratio, allowing the lower targets required under Building Regulations to be achieved with minimum thickness.

Benefits

- Excellent 0.021 W/mK Lambda value
- Robust tongue and groove jointing
- High compressive strength
- Suitable for underfloor heating
- Perimeter strips for robust detailing
- Reduced insulation thickness

TONGUE & GROOVE JOINTING



Specification Clause

The floor insulation shall be Unilin Insulation Thin-R XT/HYF manufactured to EN 13165 by Unilin Insulation, comprising of a rigid Polyisocyanurate (PIR) core between low emissivity gas tight facings. The Thin-R Plus XT/HYF_ _ _mm with an Agrément declared Lambda value of 0.021 W/mK to achieve a U-Value of __ _ _W/m²K for the floor element. To be installed in accordance with instructions issued by Unilin Insulation.

An Environmental Product Declaration (EPD), certified by IGBC is available for this product. Please contact technical support for further details.

Refer to NBS clause M10 290, M10 40, M13 260, M13 40.

Thermal Resistances

Thickness (mm)	R-Value (m²K/W)
75	3.55
100	4.75
125	5.95
150	7.10

Resistance 'R' Values

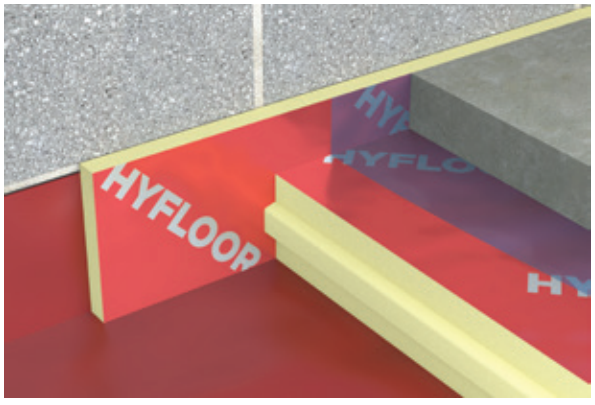
The resistance value of any thickness of Unilin insulation can be ascertained by simply dividing the thickness of the material (in metres) by its Agrément declared lambda value, for example: Lambda 0.021 W/mK and thickness 75mm -> 0.075/ 0.021 -> R-Value = 3.55. In accordance with EN 13165, R-Values should be rounded down to the nearest 0.05 (m²K/W).

XT/HYF (T&G)

1. The Hyfloor (T&G) tongue and groove jointing offers a practical on-site solution that results in a more robust continuous layer of insulation, minimising the threat of Thermal Bridging.

2. Hyfloor (T&G) is lightweight and suitable for use with underfloor heating. Thanks to its thickness to performance ratio, it allows for reduced insulation thickness. The boards should be laid staggered in a break bonded pattern and fitted tightly at edges and around any service penetrations.

3. Hyfloor (T&G) provides the most efficient means of floor insulation. It has the strength and thermal properties required to reach the high performance U-Values asked for in the Building Regulations.



4. Good detailing at the wall/floor junction is essential to reduce Thermal Bridging. By placing an upstand of Unilin Perimeter strip insulation with a minimum 25mm thickness around the external and internal wall/floor junctions, a robust detail is created.

XT/HYF (T&G)

Length (mm)	2400
Width (mm)	1200
Thickness (mm)	75, 100, 125, 150

Other thicknesses may be available depending on minimum order quantity and lead time.

Property & Units

Thermal Conductivity	0.021 (W/mK)
Compressive Strength	>140 (kPa)
Reaction to Fire	NPD

Unilin CE Declaration of Performance (DoP) for this product is available for download from our website.

THERMAL PERFORMANCE

XT/HYF (T&G)

Typical U-Values

CERTIFICATE CS/nnnn-n
U Value Competency Scheme

Table 1
U-Value calculations to EN ISO:6946 XT/HYF (T&G) Insulation for Ground Supported Floors

Build up:

- 65mm screed
- Separating layer Polythene sheet
- XT/HYF T&G with perimeter strip
- DPM 1200 gauge polythene or radon barrier
- Concrete slab

Perimeter/Area Ratio

Thickness (mm)	0.30	0.40	0.50	0.60	0.70	0.80
75mm	0.17	0.19	0.20	0.20	0.21	0.21
100mm	0.14	0.15	0.16	0.16	0.17	0.17
125mm	0.12	0.13	0.13	0.14	0.14	0.14
150mm	0.11	0.11	0.12	0.12	0.12	0.12

Table 2
U-Value calculations to EN ISO:6946 XT/HYF (T&G) Insulation for Beam and Block Suspended Floor

Build up:

- 65mm screed
- Separating layer Polythene sheet
- XT/HYF T&G with perimeter strip
- Beam and block

Perimeter/Area Ratio

Thickness (mm)	0.30	0.40	0.50	0.60	0.70	0.80
75mm	0.19	0.20	0.20	0.21	0.21	0.21
100mm	0.15	0.16	0.16	0.17	0.17	0.17
125mm	0.13	0.13	0.14	0.14	0.14	0.14
150mm	0.11	0.12	0.12	0.12	0.12	0.12

Table 3
U-Value calculations to EN ISO:6946 for IRL XT/HYF (T&G) Insulation for Hollow Core Suspended Floor

Build up:

- 65mm screed
- Separating layer Polythene sheet
- XT/HYF T&G with perimeter strip
- Hollow core slab

Perimeter/Area Ratio

Thickness (mm)	0.30	0.40	0.50	0.60	0.70	0.80
75mm	0.18	0.19	0.19	0.20	0.20	0.20
100mm	0.15	0.15	0.16	0.16	0.16	0.16
125mm	0.13	0.13	0.13	0.13	0.14	0.14
150mm	0.11	0.11	0.11	0.12	0.12	0.12

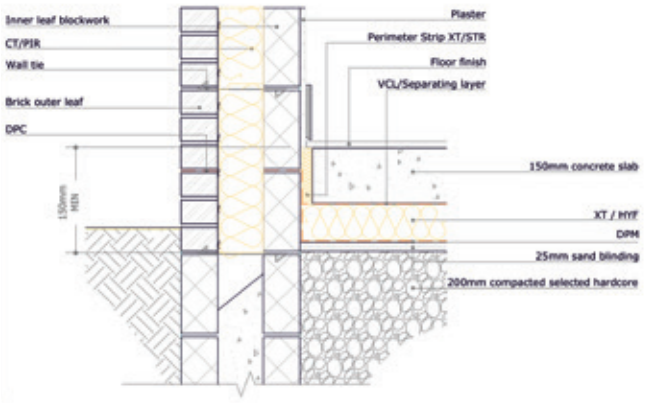
THERMAL BRIDGING

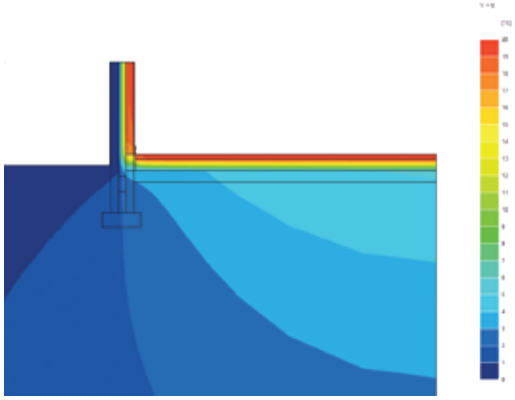
XT/HYF (T&G)

To achieve good detailing, Accredited Construction Details (ACDs) should be followed during the planning, design and build process.

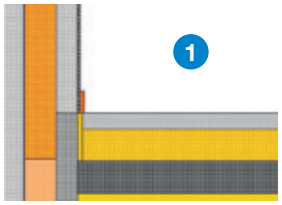
Unilin Psi Values Using ACDs

Accredited Details	Block Type	Psi
TGD L-Table D1-1.01b	Medium	0.061

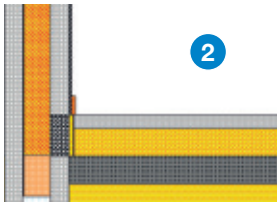




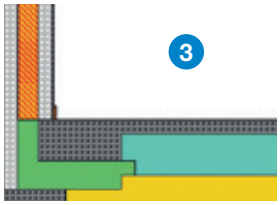
Method	Psi Value (Internal)	Strength	Engineers Calc Required
1. Hyfloor Riser Med Block 7n	0.076	7.5 N/mm²	N
2. Lightweight Block System	0.061	2.9-7.5 N/mm² (option)	Y
3. EPS Wrapped Foundation	0.105	Manufactured dependent	Y
4. HD Foamglas Break	0.056	2.9 N/mm²	Y



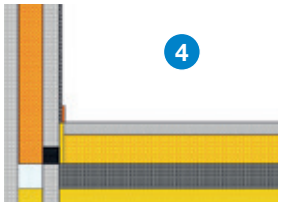
Hyfloor Riser Med Block 7n



Lightweight Block System



EPS Wrapped Foundation



HD Foamglas Break

For further information on this topic: Unilin has published Thermal Bridging guidance, request your copy from our technical department. Further certificates are also available for download from our website.

Unilin has an extensive library of downloads available on our website. These include the ACDs, BIM files, CAD drawings and Agrément certificates. Unilin also offers CPD training on Thermal Bridging as well as a wide variety of building regulation topics.

Visit unilininsulation.ie

THIN-R PLUS ENHANCED PIR INSULATION

Ground Supported & Suspended Floors

HYFLOOR STRIP FOUNDATION SYSTEM

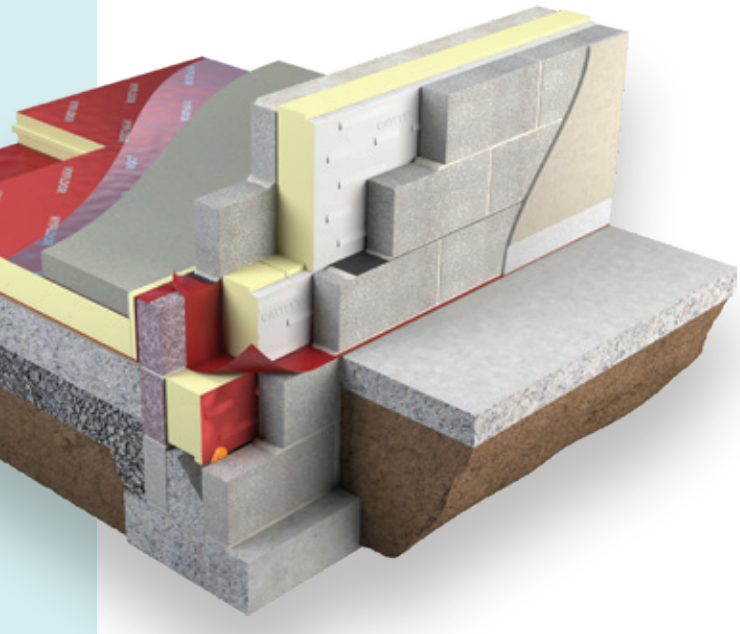
Hyfloor Strip Foundation System, combining engineered floor insulation with high performance foundation riser panels with medium density block, achieves both U-Values and Psi value detailing to achieve NZEB and passive floor performance.

Providing effective insulation, that has been detailed and installed professionally at the initial stages of any building project, has multiple benefits. Detailing properly at floor level sets the standard for the thermal performances and installation accuracy of the total building envelope; get the floor right and good practice is set for the rest of the build.

Hyfloor Strip Foundation System provides U-Value and Thermal Bridging performance to meet NZEB standards along with assurance of high compressive strength at foundation level.

Benefits

- Addresses site detailing from an early stage
- Y-Values achieved < 0.05
- Excellent 0.021 W/mK lambda value
- Floor U-Values achieved 0.11 - 0.13 W/m^{2}k
- Using blocks suitable for multi-storey buildings with a high compressive strength
- Complies with standard construction ACDs
- Traditional construction, avoiding the need for engineering assurances
- Suitable for use with built-in full fill and partial fill wall insulation



Specification Clause

The floor insulation shall be Unilin Hyfloor Strip Foundation System manufactured to EN 13165 by Unilin, comprising of a rigid T&G Jointed Polyisocyanurate (PIR) core between gas tight facings. The XT/HYF (T&G) 150mm with Agrément certified Lambda value of 0.021 W/mK to achieve a U-Value of below 0.15 W/m^{2}K for the floor element. The foundation strip insulation is to be Unilin Riser Panel to suit .....mm cavity, 225mm laid below DPC level as the riser wall is constructed. To be installed in accordance with instructions issued by Unilin.

An Environmental Product Declaration (EPD), certified by IGBC is available for this product. Please contact technical support for further details.

Traditionally, insulating at floor level didn't receive the attention by designers and site operatives that is now required to meet NZEB or Passive standards; normally within a day, the insulation and all detailing are buried within the structure. The real disconnect however is the relationship between the installation of the floor insulation and the wall insulation. Typically completed as two separate skills at different times, and often by different teams, without consideration of the effect on Thermal Bridging at the wall/floor junction.

THERMAL PERFORMANCE

FLOORS

HYFLOOR STRIP FOUNDATION SYSTEM

Table 1
Ground Supported Slab

Build up:

- 65mm screed
- Separating layer Polythene sheet
- XT/HYF T&G with perimeter strip
- DPM 1200 gauge Polythene or Radon barrier
- Concrete slab

Perimeter/Area Ratio

Thickness (mm)	0.40	0.50	0.60	0.70	0.80
75mm	0.19	0.20	0.20	0.21	0.21
100mm	0.15	0.16	0.16	0.17	0.17
125mm	0.13	0.13	0.14	0.14	0.14
150mm	0.11	0.12	0.12	0.12	0.12

Table 2
Suspended Hollow Core floor

Build up:

- 65mm screed
- Separating layer Polythene sheet
- XT/HYF T&G with perimeter strip
- Hollow core slab

Perimeter/Area Ratio

Thickness (mm)	0.40	0.50	0.60	0.70	0.80
75mm	0.19	0.19	0.20	0.20	0.20
100mm	0.15	0.16	0.16	0.16	0.16
125mm	0.13	0.13	0.13	0.14	0.14
150mm	0.11	0.11	0.12	0.12	0.12

Our Dedicated Sales Team

Meet the team who can help you with your project

Our Commitment

- Bespoke variable mixed loads of products, including phenolic
- Flexible delivery times
- Direct to site deliveries available
- Various transport vehicle types available
- Dedicated Sales Support
- Dedicated Merchants Technical Support
- On-site support and training for Installers
- 3rd Party approved technical calculations
- Access to sales opportunities
- Training of merchant staff

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Our Dedicated Technical Team

It's a complicated subject and there are still questions you might need to ask. Where can you get an honest, competent answer?

Each member of the Technical Team is there to help you with any technical issues you might have, give them a call, you'll find them easy to talk to.

Our Technical Team provides technical services throughout our customer bases in Europe and further afield from our group headquarters in Navan, Co. Meath. Their experience and expertise has been built through our engagement and participation with the Irish construction industry for over 30 years.

Ireland Technical Team

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Talk to the team who can help you with your project:

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ECO360

BIO-ENHANCED PIR INSULATION

The ECO360 strategy is a commitment by Unilin Insulation to continually review and improve the sustainable credentials of our product offering and services, to reduce the environmental impact of the projects we work on in terms of operational energy and embodied carbon.

Our ECO360 Range sees pioneering environmental improvements in the manufacturing, delivery and use of PIR insulation.

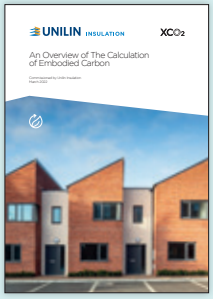
- **Bio-enhanced formulation**
- **Meets RIAI 2030 & LETI Targets**
- **Halogen free formulation**
- **Improved thermal performance of 0.020 W/mK**
- **Bio-degradable packaging materials**

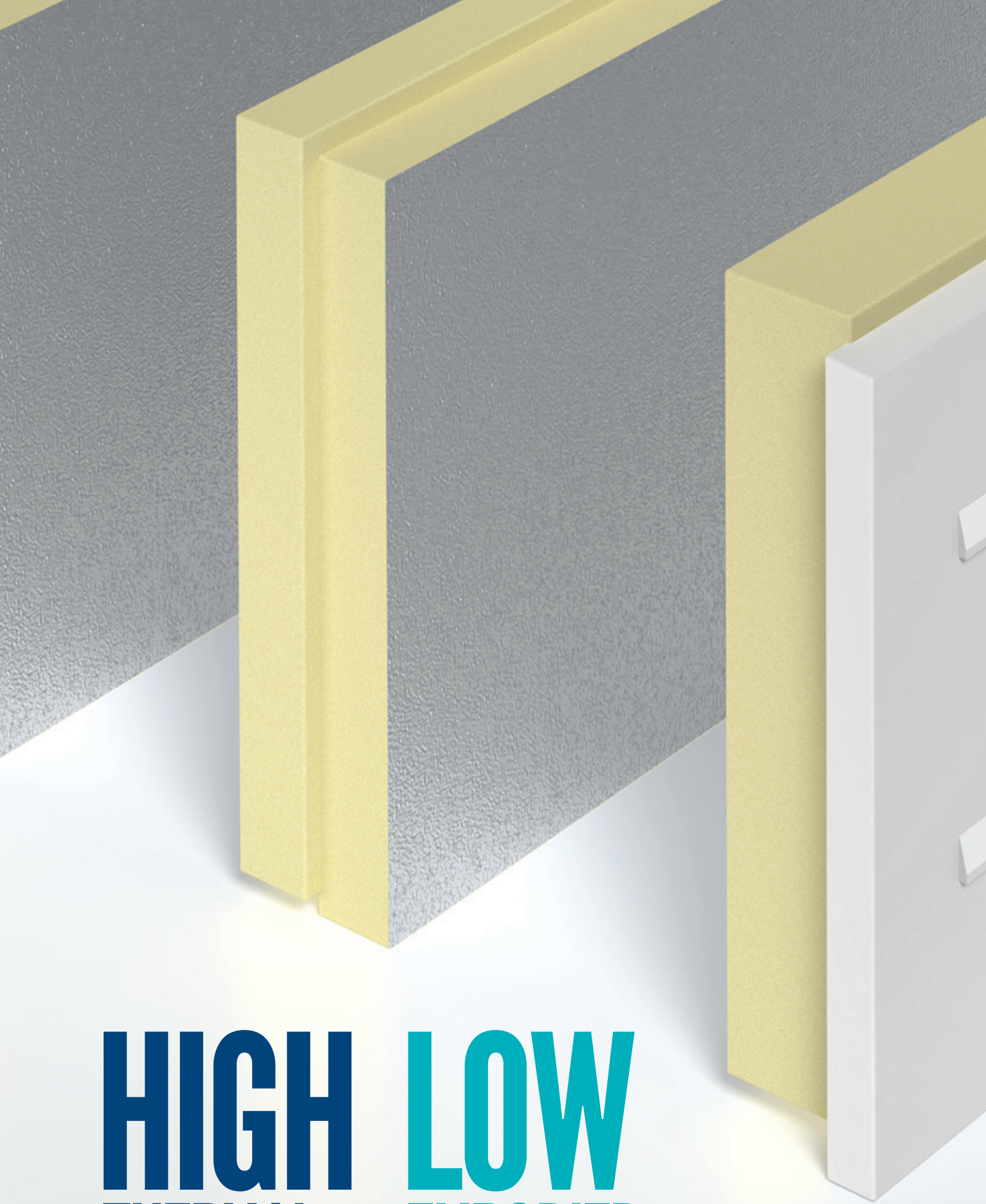
0.020 W/mK

Bio Inside

Visit the Unilin Insulation website to download our

Embodied Carbon Report





HIGH THERMAL EFFICIENCY

LOW EMBODIED CARBON

Notes

Expect more Knowledge

Unilin Insulation, formerly Xtratherm, is one of Ireland's largest manufacturers and suppliers of insulation. We have a 30 plus year history of working in partnership with construction professionals to close the gap between design and as-built performance.

FREE
One-to-one advice

Higher standards of fabric performance call for greater adherence to best practice detailing. To achieve this and to 'close the gap' between design and build, we provide a dedicated Technical Team, all qualified to the highest standards of competency in U-Value calculation and condensation risk analysis.

Here to support you

- BRE listed Thermal Bridging Detailing
- BRE/NSAI Trained Modelling
- BBA/TIMSA calculation competent
- Warranted Calculations available
- Immediate technical response
- DEAP Qualified
- Insulation systems to deliver real onsite performance

Get in touch

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unilininsulation.ie

The Sustainable Solution

Specifying Unilin Insulation is a real commitment to minimising energy consumption, harmful CO_2 emissions and their impact on the environment. Using our products is one of the most effective ways to reduce energy consumption – in fact, after just eight months the energy they save far outweighs the energy used in their production. In addition, our manufacturing facilities operate to an ISO 14001 certified Environmental Management System.

Environmental Product Declaration (EPD)

An Environmental Product Declaration or EPD for a construction product indicates a transparent, robust and credible step in the pursuit and achievement of real sustainability in practice, it is a public declaration of the environmental impacts associated with specified life cycle stages of that product. Unilin EPDs have been independently verified in accordance with EN 15804+A2:2019 and ISO 14025 accounting for stages of the LCA from A1 to A3, with options A4-A5 and modules C1-C4 and D included. The process of creating an EPD allows us to improve performance and reduce resource wastage through improvements in product design and manufacturing efficiency. They play a crucial role in manufacturing and construction and are increasingly asked for by industry.

EPDs and BREEAM

BREEAM is primarily trying to encourage designers to take EPDs into consideration when specifying products. BREEAM requires EPDs to be verified by a third-party. For the Mat 02 category, points are awarded based on whether EPDs are generic, manufacturer-specific, or product-specific. Non 3rd party verified EPDs to EN 15804 cannot be accepted. All of Unilin EPDs are externally verified.

Responsible Sourcing

Unilin has BES 6001 certification for responsible sourcing. The second BREEAM credit under that category is based on responsibly-sourced materials – at least 80% of the total insulation used in roofs, walls, ground floors and services must meet any of tier levels 1 to 6 in the BREEAM table of certification schemes. Our Environmental Management System is certified under EN ISO 14001, and our raw materials come from companies with similarly certified EMS (copies of all certificates are available for BREEAM assessments). This level of responsible sourcing meets tier level 6 in the BREEAM table.

Good workmanship and appropriate site procedures are necessary to achieve expected thermal and airtightness performance. Installation should be undertaken by professional tradespersons. The example calculations are indicative only, for specific U-Value calculations contact Unilin Insulation Technical Support. Unilin technical literature, Agrément certifications and Declarations of Performance are available for download on the Unilin Insulation website. The information contained in this publication is, to the best of our knowledge, true and accurate at the time of publication but any recommendations or suggestions which may be made are without guarantee since the conditions of use are beyond our control. Updated resources may be available on our websites. All images and content within this publication remain the property of Unilin Insulation.

bre CE

ASSOCIATE MEMBER SPRA Single Ply Roofing Association

LRWA Liquid Roofing and Waterproofing Association

ISO 9001 Quality Management Systems
ISO 14001 Environmental Management Systems