

# XtroLiner

Superior  
Performance  
PIR Insulation

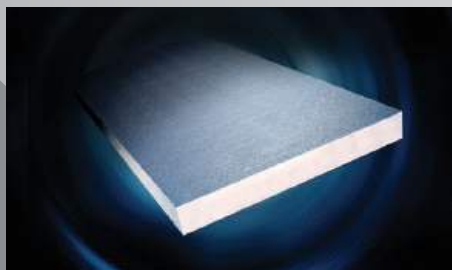


Innovative  
Products

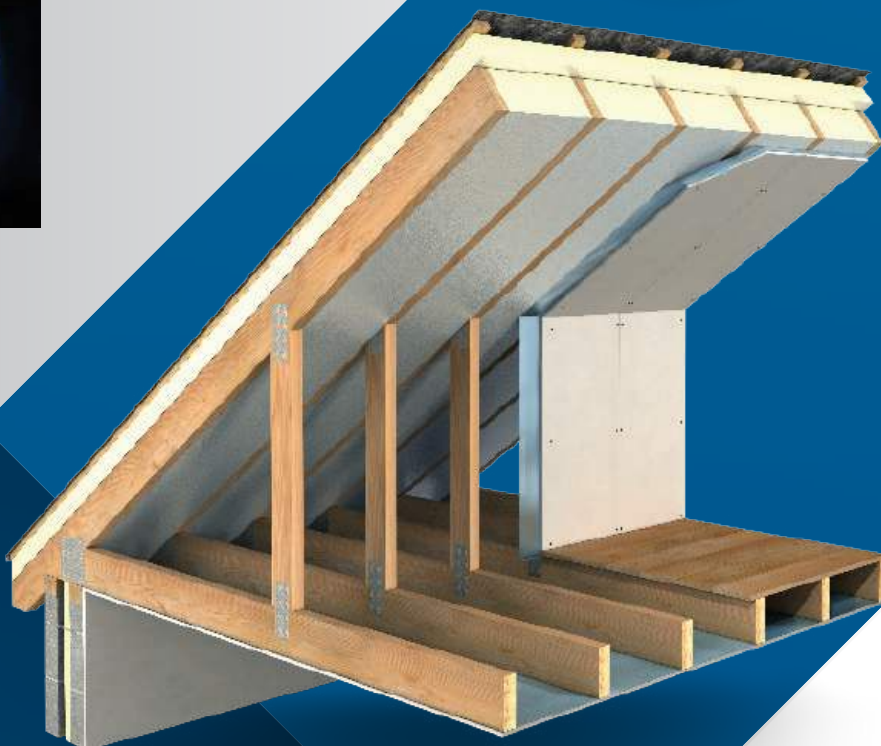
## Roofs

**XO/PR**

Insulation for  
Pitched Roof



PLATINUM  
SERVICE



# Xtratherm<sup>®</sup>

More than insulation



12/4956

# XtroLiner

Superior Performance PIR Insulation

# XO/PR

Insulation for Pitched Roof

**XtroLiner Pitched Roof XO/PR 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 XO/PR 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.



**Specification Clause**

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

Xtratherm PIR achieves an A+ rating under the BRE Green Guide.



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



**Thermal Resistances**

Thickness (mm)	R-Value (m² K/W)
25	1.15
30	1.40
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 Xtratherm 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 120mm -> 0.120/ 0.021 -> R-Value = 5.70. In accordance with EN 13165, R-values should be rounded down to the nearest 0.05 (m²K/W).

Reduces Intrusion into Living Area

Reduced Risk of Condensation

Robust Foil Facings

Lightweight and Easy to Install

Reduced Thermal Bridging

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 vapour permeable membrane is used instead of standard roofing felt, the ventilation gap may be dispensed with. Refer to manufacturer's guidelines.

**Note:**

Alternatively, a layer of insulation - covered with chipboard - can also be placed over the joists. Xtratherm Walk-R offers a ready made solution for this application.



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 XO/PR to the underside, before the plasterboard is fixed. Xtratherm XT/TL Drylining boards can also be used. 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.



**XO/PR**

<b>Length (mm)</b>	2400
<b>Width (mm)</b>	1200
<b>Thickness (mm)</b>	25, 30, 40, 50, 60, 70, 75, 80, 100, 120

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

**Property & Units**

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

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

"In every roof space where cold water tanks or other fitted appliances or services occur, the Contractor must construct a permanent boarded walkway from the roof access point to the tank ball valve position and / or the appliance location. This walkway should be supported above the first layer of insulation to prevent any compaction of insulation below the walkway."

# Installation Guidelines

## Ventilated Roof

1. Fix positioning battens to inner face of rafters, flush with the top edge of the timber.
2. Allow for ventilation gaps, normally 50mm. (May be reduced depending on breather membrane certification).
3. Cut boards with fine toothed saw to fit tightly between rafters, flush with the bottom of the rafter. Allow slight oversize of cut to achieve 'friction fit' and seal any gaps with expanding foam.
4. An additional second layer is required, this should be fixed to the underside of the rafter. Run second layer transverse to the first with joints tightly butted. Fix with nails to hold insulation in place until plasterboard is installed
5. Provide a separate vapour control layer between insulation and plasterboard or alternatively, tape the joints of the insulation with an aluminium foil tape.
6. Finish with plasterboard fixed with drylining screws. Screw fix every 150mm, 12mm from edge of boards ensuring a minimum 30mm penetration into the rafter.

**Alternatively the second layer can be achieved with XT/TL Xtratherm Drylining board.** Repeat steps 1 to 3 and replace second layer with XT/TL, a ready made PIR insulation board bonded to plasterboard. Where joints between sheets of XT/TL are unsupported by the rafters, timber noggins should be installed. Seal and tape the joints of the plasterboard in accordance with Standard Drylining Practice.

## Hybrid Roof

Follow the same procedure as before except an approved Vapour Permeable underlay is used above the rafter allowing the 50mm ventilation space to be dispensed with. Typically, a 25mm unventilated void should be maintained; Agrément certification covering the membrane should be consulted.

## Warm Roof

1. Ensure cavity wall insulation has continued to roof height to meet with the roof insulation.
2. Fix a treated timber stop rail to the end of the rafter at the eaves.
3. Lay XO/PR staggered jointed over the rafters. Ensure joints are tightly butted and fill any gaps with expanding foam. Joints should be fully supported by rafters. Boards can be temporarily fixed with nails.
4. Fix 38mm x 50mm counter battens with approved fixings through the XO/PR into the rafter. The amount of fixings is determined by the fixing manufacturer who can also provide wind load calculations.
5. A breathable sarking membrane should be fitted; refer to manufacturer's Agrément certification. Ventilation may have to be provided subject to that certification and minimises the risk of interstitial condensation forming on the underside of the membrane. Providing an unventilated void under the membrane can improve the thermal performance.
6. Secure 50mm x 25mm tiling battens through counterbatten and XO/PR to the rafter.
7. If an additional second layer is required, this should be fixed between the rafters.
8. Cut boards with fine toothed saw to fit tightly between rafters, flush with the top of the rafter. Allow slight oversize of cut to achieve 'friction fit' and seal any gaps with expanding foam.
9. Provide a separate vapour control layer between the bottom of rafter and plasterboard.
10. Finish with plasterboard fixed with drylining screws. Screw fix every 150mm, 12mm from edge of boards ensuring a minimum 30mm penetration into the rafter.



## Handling, Cutting and Storage

**Xtratherm®**

Xtratherm insulation should be stored off the ground, on a clean flat surface and must be stored under cover. The polythene wrapping is not considered adequate protection for outside exposure. Care should be taken to protect the insulation in storage and during the build process.

The insulation boards can be readily cut using a sharp knife or fine toothed saw. Ensure tight fitting of the insulation boards to achieve continuity of insulation as asked for within the ACDs. Appropriate PPE should be worn when handling insulation. Please refer to Health & Safety data sheets on our website.

The boards are wrapped in polythene packs and each pack is labelled with details of grade/type, size and number of pieces per pack.



## Durability

Xtratherm products are stable, rot proof and will remain effective for the life span of the building, dependent on specification and installation. Care should be taken to avoid contact with acids, petrol, alkalis and mineral oil, when contact is made, clean materials in a safe manner before installation.



## Typical U-Values



**Table 1**

U-Value calculations to EN ISO:6946

**XO/PR** Insulation for Pitched Roof

- Hybrid Roof:**
- Approved Breather Membrane 25mm Void
  - XO/PR between Rafters
  - XO/PR under Rafters to reduce thermal bridging
  - Vapour Control Layer
  - Plasterboard

Hybrid Roof

XtroLiner Thickness		Rafter Centres	
Between	Under	600mm	400mm
120mm	25mm*	0.16	0.17
120mm	40mm*	0.14	0.15
120mm	60mm*	0.12	0.13

\*Insulation thickness only

**Table 2**

U-Value calculations to EN ISO:6946

**XO/PR** Insulation for Pitched Roof

- Warm Roof:**
- Breather Membrane
  - XO/PR over Rafters to reduce thermal bridging
  - XO/PR between Rafters
  - Vapour Control
  - Plasterboard

Warm Roof

XtroLiner Thickness		Rafter Centres	
Between	Over	600mm	400mm
N/A	100mm	0.18	0.18
N/A	120mm	0.16	0.16
75mm	75mm	0.14	0.14
75mm	100mm	0.14	0.12

## Fabric Energy Performance

The difference is in the detail

**Fabric Energy Efficiency is based on 3 main principles:**

1. U-Values
2. Thermal Bridging
3. Air tightness

### 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.'

### How is thermal bridging measured?

Thermal bridges are calculated as a linear thermal transmittance value - PSI ( $\Psi$ ) measured in W/mK. SAP and DEAP are the software program used to calculate a dwelling's energy rating. Within this software, thermal bridging through junctions is accounted for as a 'Y-value.'

## Thermal Bridging and Airtightness

A comparison between the Y-value and a hole in the construction



**Y= 0.15**

The equivalent of an open 'Garage Door' 2.1m x 3.3m (6.93m<sup>2</sup>) opening.



**Y= 0.08**

The equivalent of an open 'Patio Door' 2.1m x 1.8m (3.78m<sup>2</sup>) opening.



**Y= 0.03**

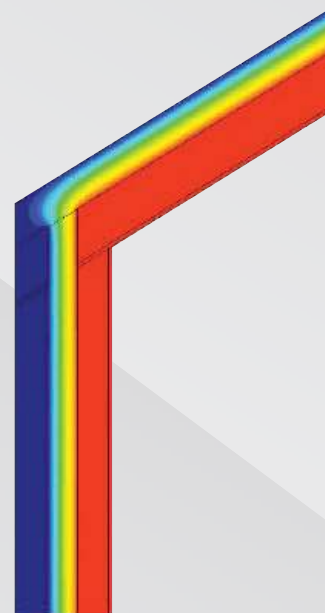
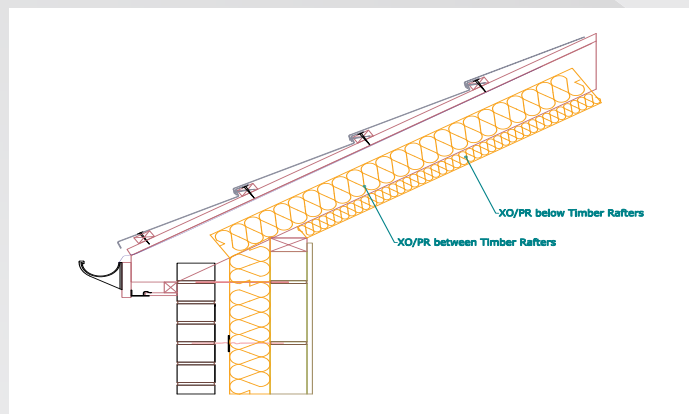
The equivalent of an open 'Window' 1.25m x 1.25m (1.56m<sup>2</sup>) opening

**Our innovative range of insulation products deliver the U-Value requirements to meet Passive standards and building regulations, but it's not just about U-Values any longer.**

How the system builds, how it interconnects at junctions and how it is witnessed and confirmed on site is as equally important. Good detailings deliver benefits:

- + More energy efficient building with lower running costs.
- + Less chance of condensation and mould forming at poorly detailed junctions.
- + A more cost effective method of achieving a low energy building.

To achieve good detailing, the Construction Details (ACDs) as per TGD Part L should be followed during the planning, design and build process.



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

### Xtratherm has an extensive library of downloads available on our website.

These include the ACDs, BIM files, CAD drawings and Agrément certificates. Xtratherm also offers CPD training on thermal bridging as well as a wide variety of building regulation topics.



#### Brochures

Download brochures for all Xtratherm products.



#### Certs & DOPs

See facts & figures on how Xtratherm performs.



#### CPDs

Find out more about Xtratherm CPD offerings in the Xi Academy.



#### ACDs (PDF)

Download Xtratherm's Accredited/Acceptable Details for Construction (ACDs).



#### Packing Lists

Get size and dimension specifications



#### Education

Xtratherm have developed educational resources for secondary and third level colleges



#### ACDs (CAD)

Download CAD files of Xtratherm Products and Accessories.



#### BIM Files

Download BIM objects of Xtratherm Products and Accessories.



#### Sustainability

Find out more about Xtratherm's Corporate Sustainability Strategy



# Expect More **KNOWLEDGE**

At Xtratherm we understand the importance of giving our customers the best technical advice.

We have taken the unique industry step of training every one of our technical team that deals directly with our customers, to the highest industry standards of competency in U-Value calculation and condensation risk analysis. We have Thermal Bridging covered also under the BRE/NSAI Thermal modelling competency scheme, using the most comprehensive 3D software available.

**Our team and products are certified in the UK and Ireland and through the following certifications bodies:**

- BRE Thermal bridging modelling competency certification
- NSAI Thermal modelling competency scheme
- TIMSA-BBA competency scheme for U-Value calculation and condensation risk analysis
- BBA and NSAI certification of the Xtratherm insulation boards
- SAP and DEAP energy assessment

**Our technical team can also provide:**

- Thermal calculations
- Technical advice on building regulations in the UK and Ireland
- Technical papers on a variety of topics
- Certified CPDs
- BIM modelling
- NBS Specifications
- Educational resources for technical secondary and tertiary colleges

**Please refer to the Resources section of our website for more details**



The **Xtratherm** Innovation Centre

The Xtratherm exhibition space and training academy has been developed to assist construction professionals in understanding the principles of specifying and achieving on-site, best practice insulation standards for new dwellings, commercial envelope solutions and refurbishment projects.



**Get in touch**

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Thermal Calculations, Technical  
Advice or to arrange a technical visit:  
**[info@xtratherm.com](mailto:info@xtratherm.com)**

# Xtratherm®

More than insulation

## The Sustainable Solution

Specifying Xtratherm is a real commitment to minimising energy consumption, harmful CO<sup>2</sup> 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.

## The BRE Green Guide

The 2008 Green Guide to Specification produced by the BRE gives Xtratherm Insulation products a rating of A or A+. Green Guide ratings are used to gain credits in BREEAM (BRE Environmental Assessment Method) for non-residential buildings, and under 'Mat 4 – Insulation' the first credit requires the building to have an Insulation Index of 2 or greater – only achievable if the weighted average rating of the insulation is A or A+. This shows that all our products have been made with materials that have been responsibly sourced. The standard sets out organisational governance, supply chain management and environmental and social aspects that are verified and ensure responsible sourcing of materials.

## Responsible Sourcing

Xtratherm 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.

## Global Warming and Ozone Depletion

All Xtratherm Insulation products use CFC- and HCFC-free materials, and are manufactured using a blowing agent with a low GWP and zero ODP.

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 Xtratherm Technical Support. Xtratherm technical literature, Agrément certifications and Declarations of Performance are available for download on the Xtratherm 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 Xtratherm.



Specifying products supported by the Xtratherm Platinum Service gives you the highest level of assistance from design stage to delivery of real performance on site, through the assurance of a validation process from calculation to installation.

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**ISO 9001** | Quality Management Systems

**ISO 14001** | Environmental Management Systems



Xtratherm, part of UNILIN group.

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