

XTROLINER

SUPERIOR PERFORMANCE
PIR INSULATION

Pitched Roofs

XO/PR

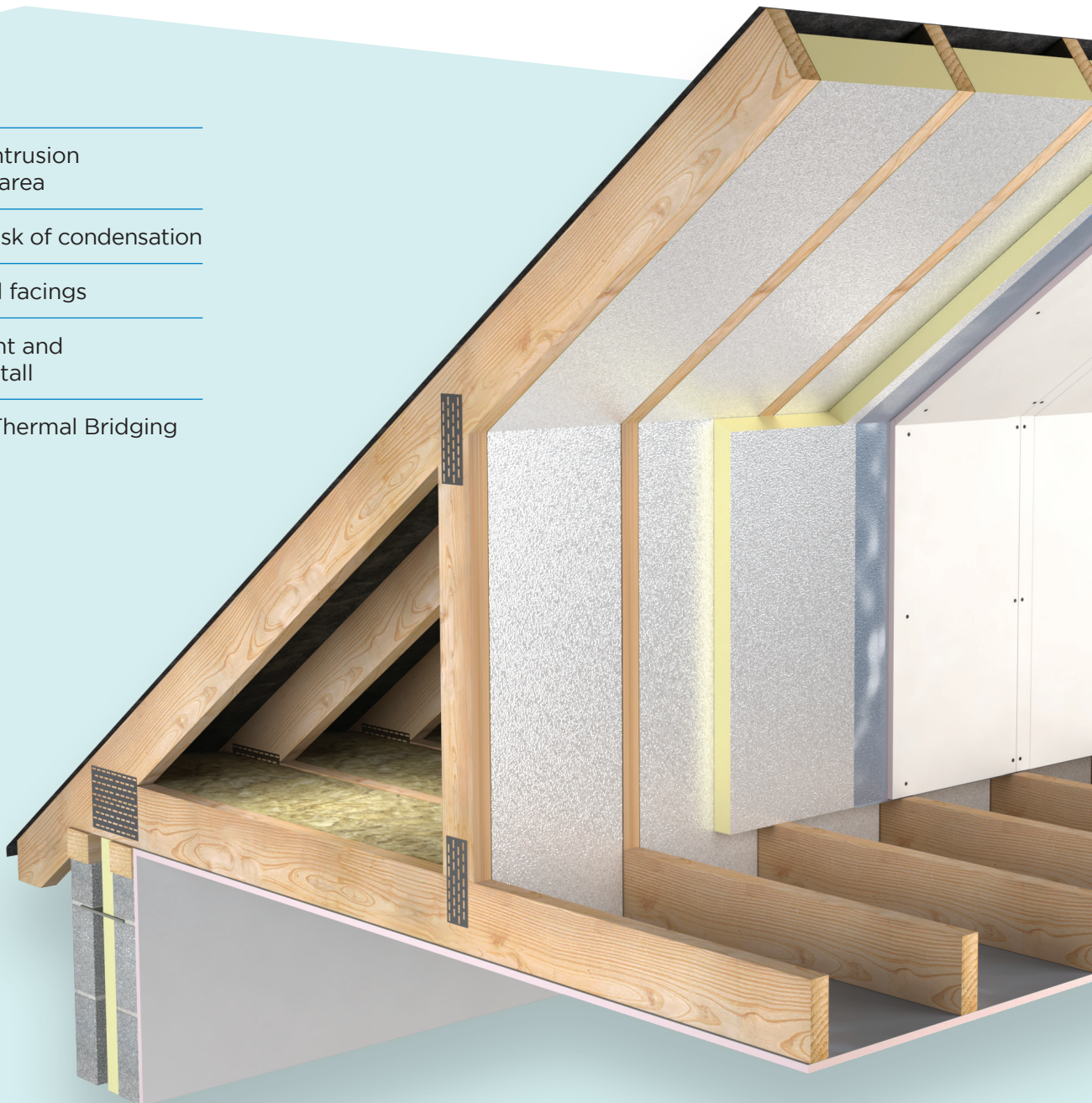
Reduces intrusion
into living area

Reduced risk of condensation

Robust foil facings

Lightweight and
easy to install

Reduced Thermal Bridging



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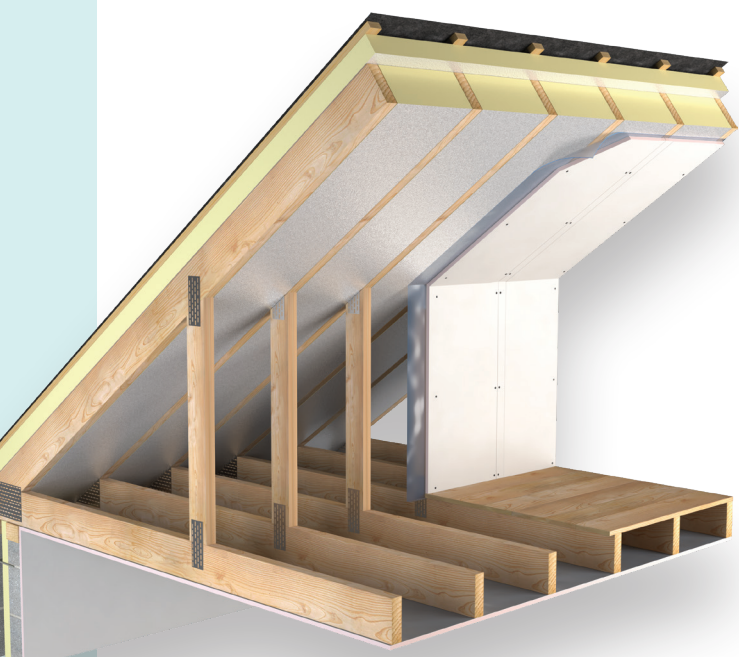
XO/PR

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 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 (m ² K/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

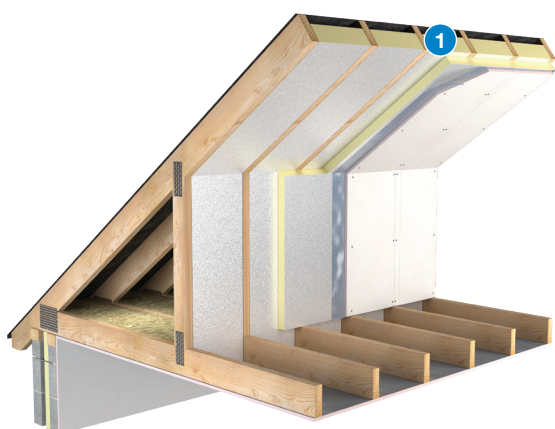
Resistance 'R' Values

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).

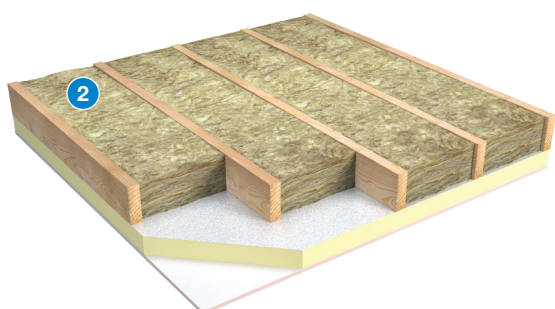


XO/PR

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.

INSTALLATION GUIDELINES

XO/PR

Ventilated Roof

1. Position and fix 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. A second continuous layer of insulation 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 25mm penetration into the rafter or alternatively follow plasterboard manufacturer installations guidance.

Alternatively the second layer can be achieved with XT/TL-MF Unilin Thermal Liner. Repeat steps 1 to 3 and replace second layer with Thin-R Thermal Liner, a ready made PIR insulation board bonded to plasterboard. Where joints between sheets of Thermal Liner 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 a breather membrane 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 XtroLiner Pitched Roof 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 insulation board 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 counter batten and XtroLiner Pitched Roof 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 25mm penetration into the rafter or alternatively follow plasterboard manufacturer installations guidance.

THERMAL PERFORMANCE

XO/PR

Typical U-Values



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

FABRIC ENERGY PERFORMANCE

THE DIFFERENCE IS IN THE DETAIL

XO/PR

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 (Ψ) measured in W/mK. DEAP is the software programme used to calculate a dwelling's energy rating. Within this software, Thermal Bridging through junctions is accounted for as a 'Y-Value.'

Thermal Bridging & 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 (6.93m²) opening.



Y= 0.08

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



Y= 0.03

The equivalent of an open 'Window' 1.25m x 1.25m (1.56m²) 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 equally as important.

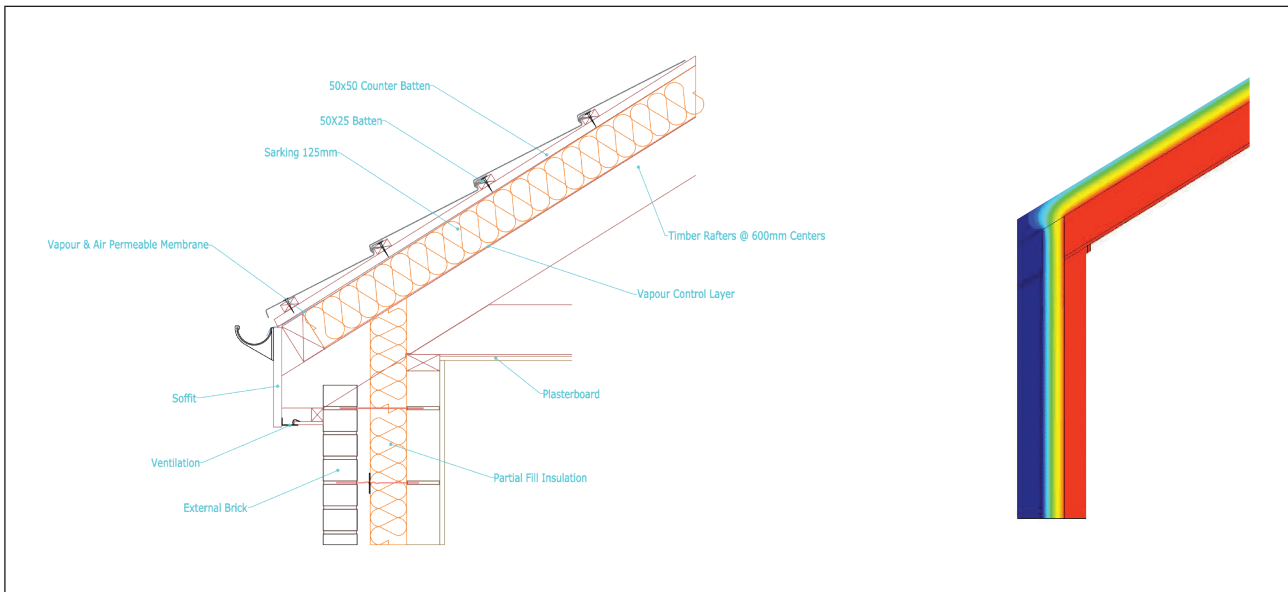
Good detailing delivers benefits:

- + 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.

THERMAL BRIDGING

XO/PR

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



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 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](http://unilininsulation.ie)



HANDLING, CUTTING & STORAGE

Unilin 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

Unilin Insulation products are stable, rot proof, provide no food value to vermin and will remain effective for the lifetime 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.





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.

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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The Sustainable Solution

Specifying Unilin Insulation is a real commitment to minimising energy consumption, harmful CO₂ 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 and 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 O2 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.

