Insulation
Britain & Ireland

First issue | 11/2026

Kooltherm® K121 Façade Board

Insulation for use behind façades



Kingspan®

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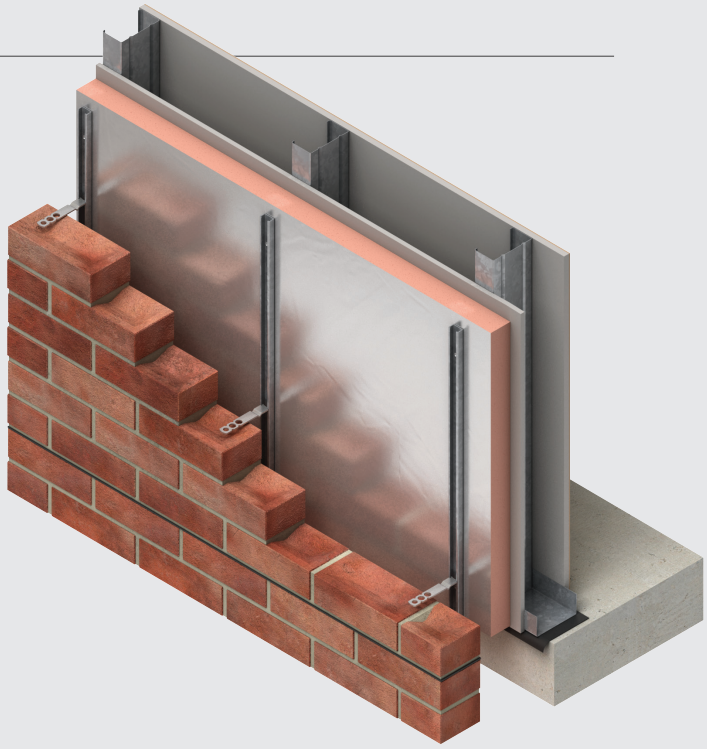
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Introduction

- Premium performance rigid thermoset phenolic insulation - thermal conductivity as low as 0.019 W/mK
- Unaffected by air infiltration
- Resistant to the passage of water vapour
- Easy to handle and install compared to some other commonly used insulants
- Ideal for new build and refurbishment



Useful links

Website

Great Britain: Kingspan Kooltherm® K121 webpage

Ireland: Kingspan Kooltherm® K121 webpage

Certification

Kingspan Kooltherm® K121 Certificate of Constancy of Performance (EU)

Declaration of Performance (DoP)

Kingspan Kooltherm® K121 Declaration of Performance

Product details

The facings

Kingspan Kooltherm® K121 is faced on both sides with a low emissivity composite foil, autohesively bonded to the insulation core during manufacture.

The core

The core of Kingspan Kooltherm® K121 is a premium performance rigid thermoset fibre-free phenolic insulant.

Standards & approvals

Kingspan Kooltherm® K121 is manufactured under a management system certified to ISO 9001: 2015 (Quality management systems), ISO 14001: 2015 (Environmental management systems), ISO 37301: 2021 (Compliance management systems), ISO 45001: 2018 (Occupational health and safety management systems) and ISO 50001: 2018 (Energy management systems).

Standard dimensions

Kingspan Kooltherm® K121 is available in the following standard size(s):

Nominal dimension		Availability
Length	(mm)	2400
Width	(mm)	1200
Insulant thickness	(mm)	Refer to local distributor or Kingspan Insulation price list for current stock and non-stock sizes.

Compressive strength

The declared compressive strength of Kingspan Kooltherm® K121 is 100 kPa when tested to BS EN 826: 2013 (Thermal insulating products for building applications. Determination of compression behaviour).

Durability

If correctly installed, Kingspan Kooltherm® K121 can have an indefinite life. Its durability depends on the supporting structure and the conditions of its use.

Resistance to solvents, fungi & rodents

The insulation core is resistant to short-term contact with petrol and with most dilute acids, alkalis and mineral oils. However, it is recommended that any spills be cleaned off fully before the boards are installed. Ensure that safe methods of cleaning are used, as recommended by the suppliers of the spilt liquid. The insulation core is not resistant to some solvent-based adhesive systems, particularly those containing methyl ethyl ketone. Adhesives containing such solvents should not be used in association with this product. Damaged boards or boards that have been in contact with harsh solvents or acids should not be used.

The insulation core and facings used in the manufacture of Kingspan Kooltherm® K121 resist attack by mould and microbial growth, and do not provide any food value to vermin.

Thermal properties

The λ-values and R-values detailed below are quoted in accordance with BS EN 13166: 2012 + A2: 2016 (Thermal insulation products for buildings. Factory made phenolic foam (PF) products. Specification).

Thermal conductivity

The boards achieve a thermal conductivity (λ-value) of 0.019 W/mK.

Thermal resistance

Thermal resistance (R-value) varies with thickness and is calculated by dividing the thickness of the board (expressed in metres) by its thermal conductivity. The resulting number is rounded down to the nearest 0.05 (m^2K/W).

Insulant thickness (mm)	Thermal resistance (m^2K/W)
60	3.15
70	3.65
80	4.20
90	4.70
100	5.25
110	5.75
120	6.30
130	6.80
140	7.35
150	7.85

NB Kingspan Insulation's maximum available single insulation thickness is subject to alteration without notice. Refer to local distributor or Kingspan Insulation price list for current stock and non-stock sizes.

Product Details

Fire performance

There are potential restrictions placed upon this product which vary dependant on building type, height, construction and location. For guidance regarding the routes to compliance for meeting the fire safety requirements of the Building Regulations / Standards, refer to the Kingspan Insulation website:

- **Kingspan Insulation Great Britain**
- **Kingspan Insulation Ireland.**

Kingspan Kooltherm® K121 achieves European Classification (Euroclass) B-s2,d0 when classified to EN 13501-1: 2018 (Fire classification of construction products and building elements - Classification using data from reaction to fire tests). Please see the table below for further test information, conditions and field of application.

Test report number	EFR-25-001750-SBI-Revision 3 and EFR-25-001750-SF- Revision 3
Classification report number	EFR-25-001750-Revision 5
Product thickness (mm)	60- 150
Substrate	Valid with any substrate, except plasterboards, of at least A2-s1,d0 class and at least 9 mm thick and 652 kg/m^3 density
Joints / edges	Vertical and horizontal joints and any edge type

To download test & classification reports please visit the Kingspan Insulation website.

Kingspan Kooltherm® K121 is assessed under Assessment and Verification of Constancy of Performance (AVCP) System 1 for Reaction for Fire.

Certificate of Constancy of Performance	1812-CPR-2445

Further details of the fire performance of Kingspan Insulation products may be obtained from the Kingspan Insulation Technical Service Department (see rear cover).

You can find our fire resistance test data on our website. Each report is accompanied by field of direct application information which defines the permissible variations that can be introduced to a tested specimen without requiring further testing or assessment. Click here for more information.

Typical constructions

Assumptions

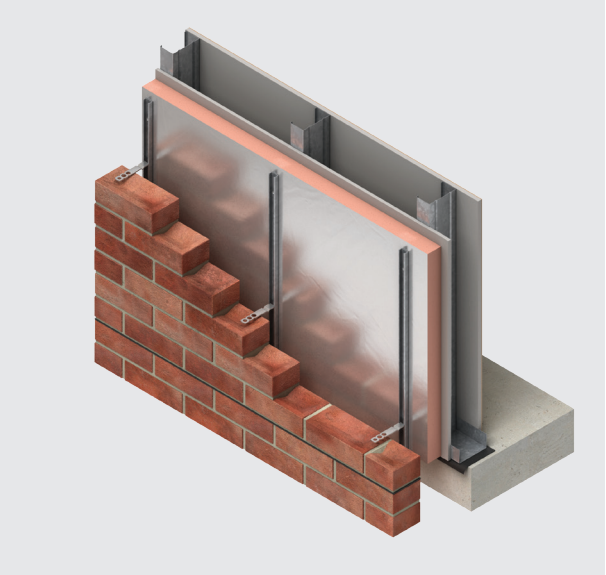
Rainscreen façade systems are proprietary, resulting in a wide variation of possible system build-ups, material combinations and mechanisms that are used to fix and support the external cladding to the wall structure.

Fixings and supports penetrating the insulation through to the structure form point thermal bridges. The effect on the thermal performance of the overall façade system can be significant. Whilst the use of thermal isolators can assist in mitigating the impact of thermal bridging, the type and placement of fixings and supports can exacerbate heat flow through the façade assembly affecting the U-value.

For these reasons, it is advised that the Kingspan Insulation Technical Service Department is contacted for specific U-value calculations (see rear cover for details).

All calculations are undertaken using the method detailed in BS EN ISO 6946: 2017 (Building components and building elements. Thermal resistance and thermal transmittance. Calculation methods), and using the conventions set out in BR 443 (Conventions for U-value calculations).

NB There are potential restrictions placed upon this product which vary dependant on building type, height, construction and location. For guidance regarding the routes to compliance for meeting the fire safety requirements of the Building Regulations / Standards, refer to the Kingspan Insulation website.



Design considerations

Linear thermal bridging at junctions & point thermal bridging

Basic principles

Linear thermal bridging describes the heat loss / gain that occurs at junctions between elements e.g. where an external wall meets the roof, or at junctions around openings in the building fabric where the thermal insulation layer is discontinuous e.g. sills, jambs and lintels.

Interruptions within the insulation layer by materials with poorer insulating properties can result in a thermal bridge, which in turn can lead to problems of condensation and mould growth, especially if there is a drop in surface temperature.

The heat flow at these junctions and opening locations, over and above that through the adjoining plane elements, is the linear thermal transmittance of the thermal bridge: measured in W/mK; referred to as a 'psi-value'; and expressed as a 'ψ-value'.

The lower the ψ-value, the better the performance, ψ-values are taken into account in the calculation methodologies e.g. the Standard Assessment Procedure (SAP) that are used to assess the operational CO_2 emissions and, where applicable, the fabric energy efficiency of new buildings.

ψ-values can comprise either, or a combination of, approved, calculated or assumed values.

Existing building junction losses are not typically accounted for in whole building heat loss calculations and only the risks of surface condensation and mould growth are considered.

Point thermal bridging describes the heat loss associated with penetrating an insulation layer at discrete points. Point thermal bridging is typically used as an adjustment to a U-value for an element, taking account of the number of brackets, fixings or fasteners (n) and their associated point thermal losses; these losses are measured in W/mK; referred to as a 'chi-values'; and expressed as a 'χ-values'.

The U-value of a rainscreen wall is adjusted to account for point thermal bridging by adding an adjustment to the U-value based on the number of penetrations per square metre of wall (n) multiplied by the calculated point thermal transmittance (χ) for brackets penetrating the insulation layer. The χ-value can be determined though 3-Dimensional numerical calculation as described in BS EN ISO 10211: 2017 (Thermal bridges in building construction. Heat flows and surface temperatures. Detailed calculations).

Reducing linear & point thermal bridging

Heat typically flows through the easiest path. For a wall insulated with Kingspan Kooltherm® K121, the main linear thermal bridges are the reveals, exposed slab edges and balconies, the junctions between the walls and the roof and where the external wall and ground floor meet. In addition, point linear transmittance will occur through the rainscreen fixing system chosen, where the rainscreen supports penetrate the insulation layer.

Whilst there are some 'approved' details available for insulation installed to the outer face of the construction, these are largely targeted at new build constructions. However, where applicable, they are also considered good practice for refurbishment.

Continuity of insulation is the best approach to limiting losses from junctions or from losses associated with fixing the rainscreen façade; failing continuity, overlap of insulation layers and use of lower conductivity materials represents a good practice approach; however where neither option is possible, the risk of condensation will require particular consideration in determining an appropriate approach. Details and designs should be considered in the context of the building, it's construction, characteristics, condition and ventilation provisions.

Detailing at junctions to minimise the effects of linear thermal bridging and the associated risk of condensation or mould growth is important and there are some simple design considerations that can be adopted when insulating to help mitigate the risks and to reduce heat loss.

- The reveal linear thermal bridge can be avoided either by positioning the window frame so that it overlaps the insulated cavity barrier, or if this is not possible, the linear thermal bridge can be reduced by insulating the reveal at jambs, head and sill. Where existing windows or doors are not replaced as part of renovation works, design and detailing of the rainscreen façade should consider the potential for future window replacement works.
- One of the largest thermal bridging losses for buildings is the heat lost through junctions between balconies and the external wall / intermediate floor. Good practice for new buildings is to isolate the external balcony from the building structure, using an appropriate thermal break, combined with consideration of the reinforcement material used to connect the balcony back to the main structure (e.g. stainless steel has a much lower thermal conductivity than mild steel).

Design considerations

- For existing buildings, the option to use an appropriate thermal break may not be available and the effect of heat loss from balconies through the external rainscreen façade needs careful consideration; wrapping the external balcony in appropriate insulation can assist in this circumstance to reduce the effects of heat lost through this junction.
- For a new build construction, where Kingspan Kooltherm® K121 is used to sheath a frame construction at the edge of ground floors, the distance between the top surface of the floor insulation or perimeter insulation upstand, and the bottom of the wall insulation must be a minimum of 150 mm for a concrete floor and 200 mm for a suspended timber floor. The further appropriate wall insulation extends past the floor insulation, the better the thermal performance of the junction between the wall and the floor. For advice on the appropriate insulation to be used, please contact the Kingspan Insulation Technical Service Department (see rear cover for details).
- For existing building's junctions between walls and ground floor, good practice wherever possible is to extend the insulation below ground level, so that wall and floor insulation layers overlap; best practice would be to excavate and extend appropriate external insulation below ground level (ideally by at least 300 mm below finished floor level) to increase the heat flow path and therefore reduce junction losses.
- Where the rainscreen system is used at roof level as part of a parapet detail, insulation continuity should be maintained using an appropriate insulated upstand to reduce cold bridging. A minimum 25 mm thick insulated upstand should be used around the perimeter of the roof on the internal façade of parapets. The upstand should extend a minimum of 150 mm above the roof insulation and achieve a minimum distance of 300 mm between the top of the insulation upstand and the bottom of the horizontal roof insulation. Insulation should be carried up into parapets at least as high as the flat roof insulation upstand.

Where insulating as part of a rainscreen system, there are also some simple design considerations that can be adopted to reduce point thermal transmittance.

- Point thermal bridges cause increased flow of heat and should be taken into consideration when designing a façade / façade system. The first priority should be to eliminate continuous conductive elements and instead use discontinuous supports to make required connections back to structure. When the thermal bridge is a necessity, such as when the structure must penetrate uninterrupted through the insulation, look for materials with the lowest possible thermal conductivity or that allows for a reduction in the amount that the insulation layer is bridged. Thermal decoupling of the substructure from the ventilated façade can be achieved through thermal separation layers. The use of a neoprene / plastic gasket, between the 'helping hand' bracket and the structure, can help to mitigate the effects of cold bridging.
- Support system suppliers should be able to calculate the thermal value of their brackets and isolators, and ensure that the installation minimises the overall impact of thermal bridging. However, in most instances a detailed three-dimensional U-value is required to assess the impact of the chosen design on the framing system. Please contact the Kingspan Insulation Technical Service Department (see rear cover) for further information.

For further advice on reducing linear and point thermal bridging, please contact the Kingspan Insulation Technical Service Department (see rear cover for details).

Design considerations

Responsible sourcing

Kingspan Kooltherm® K121 produced at Kingspan Insulation's Pembridge, Herefordshire manufacturing facility is manufactured under a management system certified to ISO 14001: 2015 (Environmental management systems).

NB The above information is correct at the time of writing. Please confirm at the point of need by visiting the Kingspan Insulation website (see rear cover for details), from which copies of Kingspan Insulation's certificates can be obtained.

Sustainability & responsibility

Kingspan Insulation has a long-term commitment to sustainability and responsibility: as a manufacturer and supplier of insulation products; as an employer; as a substantial landholder; and as a key member of its neighbouring communities.

A report covering the sustainability and responsibility of Kingspan Insulation Ltd's British operations at its Pembridge, Herefordshire and Selby, North Yorkshire manufacturing facilities is available upon request from **literature@kingspaninsulation.co.uk**.

Specification clause

Kingspan Kooltherm® K121 should be described in specifications as:-

The wall insulation shall be Kingspan Kooltherm® K121 Façade Board ____ mm thick: comprising a premium performance rigid thermoset fibre-free phenolic insulation core faced on both sides with a low emissivity composite foil facing. The product shall achieve a thermal conductivity of 0.019 W/mK. The product shall be manufactured under a management system certified to ISO 9001: 2015, ISO 14001: 2015, ISO 37301: 2021, ISO 45001: 2018 and ISO 50001: 2018; by Kingspan Insulation Limited; and installed in accordance with the instructions issued by them.

Product classifications

Uniclass UK

Pr_25_71_63_59 Phenolic foam boards (primary)
Pr_80_77_76_62 Phenolic foam insulation

CAWS

H20/10 (Sheet cladding)
H20/150 (Sheet cladding (attached to metal support systems))
H20/155 (Sheet cladding (attached to timber battens))
H92/776 (Thermal insulation)

Details also available on **NBS Source**.

Fire safety

For guidance regarding the routes to compliance for meeting the fire safety requirements of the Building Regulations / Standards, refer to the Kingspan Insulation website:

- **Kingspan Insulation Great Britain**
- **Kingspan Insulation Ireland.**

Fire stop & cavity barrier strategy

Current guidance to the Building Regulations should be considered with regard to the performance requirements for, and the provision of fire stops and cavity barriers.

Water vapour control / condensation

Consideration should be given to the risk of condensation, when designing thermal elements.

A condensation risk analysis should be carried out following the procedures set out in BS 5250: 2021 (Management of moisture in buildings. Code of practice). The Kingspan Insulation Technical Service Department can provide this service.

Glazed façade systems

Contact the Kingspan Insulation Technical Service Department for advice regarding the use of Kingspan Kooltherm® K121 in glazed applications.

Lightning protection

Building designers should give consideration to the requirements of BS EN 62305: 2011 (Protection against lightning).

Sitework

Installation

- The installation guidance for Kingspan Kooltherm® K121 outlined in this section must only be followed after considering the below.
- There are potential restrictions placed upon this product which vary dependant on building type, height, construction and location. For guidance regarding the routes to compliance for meeting the fire safety requirements of the Building Regulations / Standards, refer to the Kingspan Insulation website:
  - **Kingspan Insulation Great Britain**
  - **Kingspan Insulation Ireland.**
- Since rainscreen façade systems are proprietary and use differing mechanisms to fix and support the external cladding to the wall structure, installation guidance should be sought from the system manufacturer or supplier.
- Nevertheless, in the absence of any other guidance the instructions set out below may be followed.
- Insulation boards should be installed break-bonded with board edges lightly butted and in such a manner to achieve a close fit between the board and substrate interface so as to avoid gaps behind or between the boards.
- Boards should be cut neatly around fixings and brackets, so as to avoid gaps. Where small gaps are unavoidable, fill gaps with fire rated expanding sealant.
- The number and type of mechanical fixings required to fix Kingspan Kooltherm® K121 will vary with the geographical location of the building, the local topography, the height and width of the wall concerned, the wall structure, and the type of mechanism being used to attach the cladding system.
- A minimum of 3.13 fixings per m^2 are required to secure the insulation board to the wall structure.
- The requirement for additional fixings should be assessed in accordance with BS EN 1991–1-4: 2005 + A1: 2010 (UK National Annex to Eurocode 1. Actions on structures - General actions - Wind actions).
- The fixings should be evenly distributed over the whole area of the board.
- Refer to the column on page 11 for recommended fixing patterns.
- Fixings at board edges must be located > 50 mm and < 150 mm from edges and corners of the board and not overlap board joints.

  Refer to:

Ejot UK Limited **www.ejot.co.uk**	+44 (0) 1977 687 040
Fixfast **www.fixfast.com**	+44 (0) 1732 882 387
MAK Fasteners **www.makfasteners.com**	+353 (0) 1 451 99 00
SFS Group Fastening Technology Ltd **www.uk.sfs.com**	+44 (0) 330 0555 888

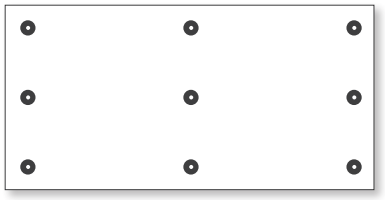
- The joints of Kingspan Kooltherm® K121 should always be taped using a 75 mm min. wide suitable self-adhesive aluminium foil tape.
- In the absence of other protection, exposed edges of Kingspan Kooltherm® K121 should be protected by a suitable self-adhesive aluminium foil tape, with a 50 mm min. wide overlap onto the insulation board face.
- For advice on the specification of self-adhesive aluminium foil tape and application guidelines, refer to:

Bostik Limited **www.bostik.co.uk**	+44 (0) 1785 272 625

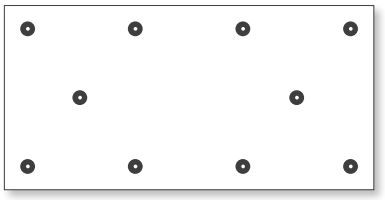
Sitework

Recommended fixing patterns

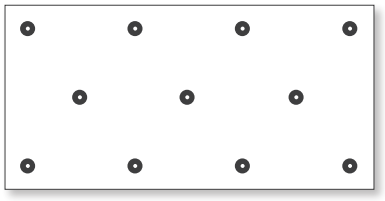
- The images below show recommended fixing patterns, the number of fixings used and the resulting fixing density (number of fixings per m^2).



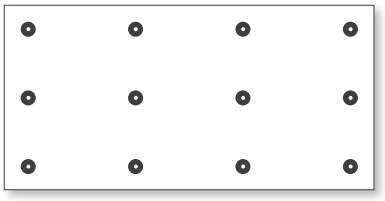
9 no. per board
(2.4 x 1.2 m board - 3.13 fixings / m^2)



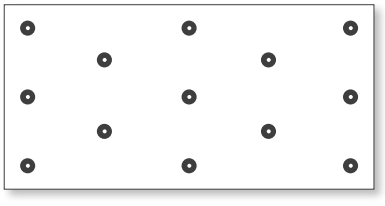
10 no. per board
(2.4 x 1.2 m board - 3.47 fixings / m^2)



11 no. per board
(2.4 x 1.2 m board - 3.82 fixings / m^2)



12 no. per board
(2.4 x 1.2 m board - 4.17 fixings / m^2)



13 no. per board
(2.4 x 1.2 m board - 4.51 fixings / m^2)

General

Cutting

- Cutting should be carried out either by using a fine toothed saw, or by scoring with a sharp knife, snapping the board over a straight edge and then cutting the facing on the other side.
- Ensure accurate trimming to achieve close butting joints and continuity of insulation.

Daily working practice

- At the completion of each day's work, or whenever work is interrupted for extended periods of time, board edges and joints should be protected from inclement weather.

Availability

- Kingspan Kooltherm® K121 is available through specialist insulation distributors and selected builders' merchants throughout the UK.

Packaging & storage

- The polyethylene packaging of Kingspan Insulation products, which is recyclable, should not be considered adequate for outdoor protection.
- Ideally, boards should be stored inside a building. If, however, outside storage cannot be avoided, then the boards should be stacked clear of the ground and covered with an opaque polythene sheet or weatherproof tarpaulin. Boards that have been allowed to get wet should not be used.

Health & safety

- Kingspan Insulation products are chemically inert.
- A Safety Information Data Sheet for this product is available from the Kingspan Insulation website **www.kingspaninsulation.co.uk/safety or www.kingspaninsulation.ie/safety.**

Please note that the reflective surfaces on this product are designed to enhance its thermal performance. As such, they will reflect light as well as heat, including ultraviolet light. Therefore, if this product is being installed during very bright or sunny weather, it is advisable to wear UV protective sunglasses or goggles, and if the skin is exposed for a significant period of time, to protect the bare skin with a UV block sun cream.

The reflective facings used on this product can be slippery when wet. Therefore, it is recommended that any excess material should be contained to avoid a slip hazard.

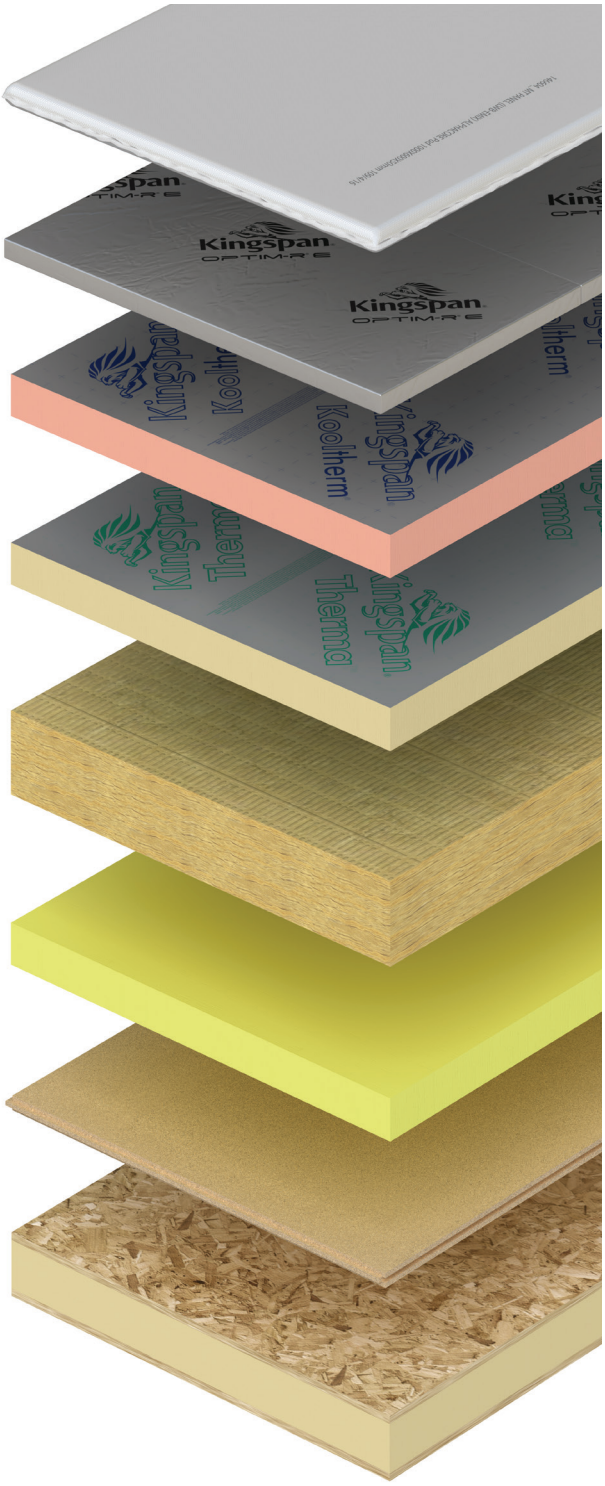
Warning - do not stand on or otherwise support your weight on this product unless it is fully supported by a load bearing surface.

About Kingspan Insulation

Products & solutions

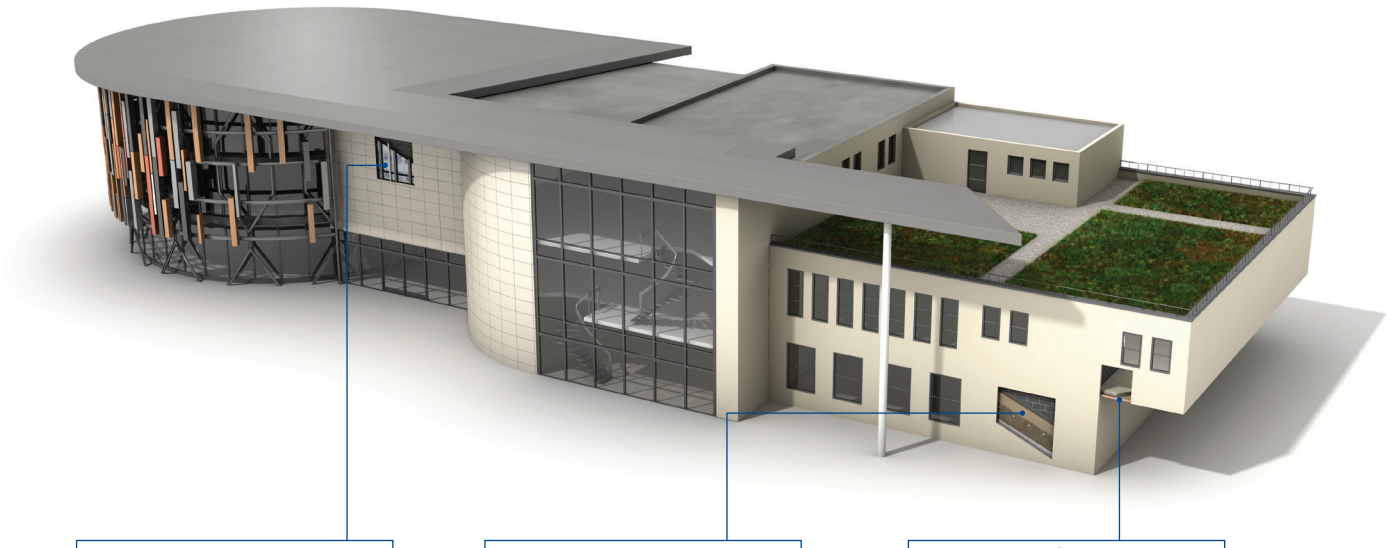
Rigid insulation products for building fabric applications, including roofs, walls and floors.

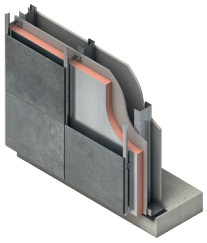
- Kingspan AlphaCore® – microporous silica-based insulation.
- Kingspan OPTIM-R® – vacuum insulation panel (VIP) systems.
- Kingspan Kooltherm® – phenolic insulation.
- Kingspan Therma™ – PIR insulation.
- Kingspan K-Roc® – rock mineral fibre insulation.
- Kingspan GreenGuard® – extruded polystyrene insulation (XPS).
- STEICO - wood fibre insulation.
- Kingspan TEK® – structural insulated panels (SIPs).
- Cavity closers – PVC-U extrusions with an insulation cor
- Membranes – for pitched roofs and walls.



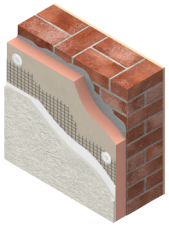
About Kingspan Insulation

Solutions available for roofs, walls and floors of commercial buildings, from schools to retail.





Insulation for use behind rainscreen or masonry façade systems



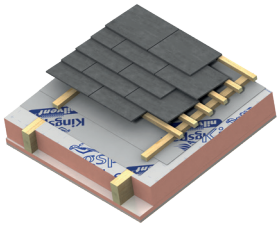
External insulation for masonry walls



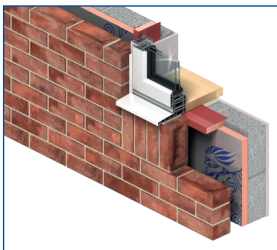
Insulation for structural ceilings (soffits)

About Kingspan Insulation

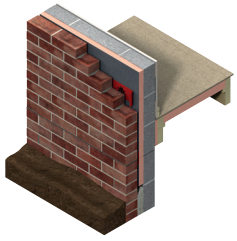
From new housing developments to refurbishing your home, we offer a number of different solutions for roof, wall and floor applications.



Insulation for tiled or slated pitched warm roof spaces



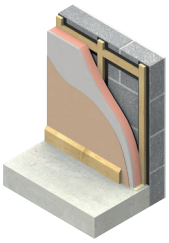
Insulated extrusions for closing wall cavities at openings



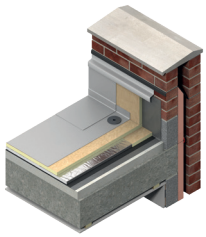
Full and partial fill cavity wall insulation



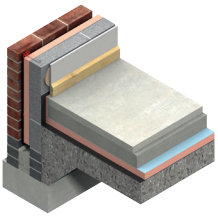




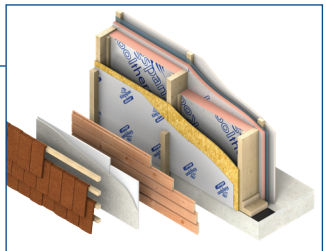
Insulation for tiled or slated pitched warm roof spaces



Insulation for flat roofs and terraces



Insulation for floors



Insulation for timber and steel framing systems

About Kingspan Insulation

Company details

Kingspan Insulation Ltd is part of the Kingspan Group plc., one of Europe's leading construction product manufacturers. The Kingspan Group was formed in the late 1960s and is a publicly quoted group of companies headquartered in Kingscourt, County Cavan, Ireland.



Kingspan Group, Ireland

Kingspan Insulation Ltd is a leading manufacturer of rigid insulation products and insulated systems for building fabric and building services applications.

Our GB head office is located in Pembridge, in the heart of rural Herefordshire. Our northern hub is near Selby in North Yorkshire. We also have a site in Castleblayney, Ireland. All three sites are accredited to the independent compliance standard ISO 37301: 2021.



Kingspan Insulation, Pembridge

Services

Our support services provide fast and accurate advice no matter what your role is. Visit our website to access the following services.

- U-value calculations – free, quick and easy U-value calculations with our U-value Calculator.
- Help and advice on your projects, including stockists, how to guides, regulatory guidance and e-learning.
- Dedicated Specification and Sales teams to support projects.
- Building Information Modelling (BIM) – download BIM objects for our products.
- Tapered roofing service – Kingspan Insulation's tapered roofing systems come with a supporting design service to ensure the most cost-effective solution for a roof is identified.



Tapered roofing service

- CPDs – Kingspan Insulation offers a number of free CPD seminars for architects and specifiers covering a wide range of industry topics. CPDs can be booked or a range of courses can be found online.
- Product awareness training – build your team's knowledge with on-site training and support with one of our experienced product technicians who cover the full range of Kingspan products and applications, from flooring to roofing and everything in-between with both internal and external wall insulations.



Product awareness training

PLANET PASSIONATE

Planet Passionate is our group wide global sustainability programme.

Our Planet Passionate programme aims to have a positive impact on three big global challenges: climate change, circularity and protection of our natural world.

Scan for our latest progress report to learn more about our targets, partnerships and global commitments.



Contact details

Great Britain

Pembridge | Leominster
Herefordshire | HR6 9LA

T: +44 (0) 1544 388 601
E: info@kingspaninsulation.co.uk
www.kingspaninsulation.co.uk

For individual department contact details please visit
www.kingspaninsulation.co.uk/contact

Visit our free online U-value calculator.
Offering free, quick and easy calculations for wall, floor and roof constructions.

Ireland

Kingspan Insulation Ltd
Castleblayney | County Monaghan

T: +353 (0) 42 979 5000
E: info@kingspaninsulation.ie
www.kingspaninsulation.ie

For individual department contact details please visit
www.kingspaninsulation.ie/contact

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