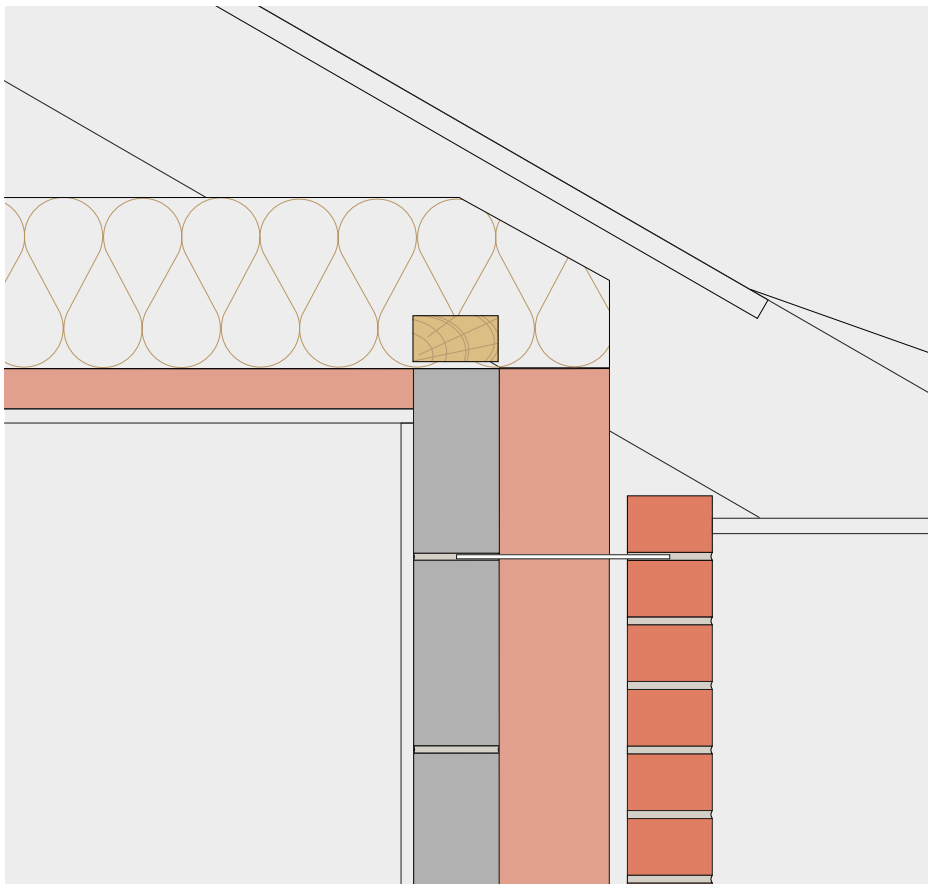
Insulation
Ireland

Second Issue | 09/2025

Kooltherm® K8 Plus Cavity Board

Standard details & indicative Ψ-values (psi-values)



- Indicative psi-values for the majority of the most common junction types
- Temperature factors provided for each junction
- Achieved U-value results for the elements in each junction
- Illustrative and temperature diagrams provided for each junction type

Kingspan®

Contents

Introduction

Heat loss from junctions

Thermal bridging occurring at the junctions of a building's planar elements (i.e. between roofs, walls, openings, and floors) can add significantly to a building's total fabric heat loss.

Higher heat flows occur at junctions due to complex geometries, or from the use of materials with a higher thermal conductivity than the adjacent materials.
This can cause localised reductions in the internal surface temperatures, which can lead to surface condensation and mould growth problems. Good design detailing can help to avoid these issues. The details in this guidance have been developed with the aims of being buildable, achieving good thermal performance, and minimal risk.

Linear thermal bridging describes the heat-loss occurring at junctions between elements e.g. between a wall and floor, or around openings e.g. at sills, lintels, and jambs.
A Ψ–value (psi-value) is the heat loss through a junction, which is additional to the heat flow through the adjoining plane elements, and is expressed in W/mK.

Ψ–values are not taken into account in U–value calculations, but, instead, they are taken into account separately in the calculation methodologies e.g. Dwelling Energy Assessment Procedure (DEAP) that are used to assess the operational CO_2 emissions and, where applicable, the fabric energy efficiency of buildings, primary energy or delivered energy rates.

Junctions & building compliance

Ireland

There are four possibilities for specifying thermal bridging:

a. Adopt Acceptable Construction Details.

b. Adopt Acceptable Construction Details sections 1 to 6 combined with details from Appendix 2 of the document "Limiting Thermal Bridging and Air Infiltration - Acceptable Construction Details" or other certified details (as per below) for all key junctions.

c. Use certified details which have been assessed in accordance, and comply with Appendix D of Technical Guidance Document L 2022 e.g. certified by a third party certification body.

d. Use alternative details which limit the risk of mould growth and surface condensation to an acceptable level as set out in paragraph D.2 of Appendix D of Technical Guidance Document L 2022, for all junctions.

Northern Ireland

There are four possibilities for specifying thermal bridging:

a. Details conform to those of a reputable non-government database containing independently assessed thermal junction details, such as Local Authority Building Control's Construction Details library.

b. Ψ-values calculated by a person with suitable expertise and experience in accordance with BRE IP 1/06 and BR 497 (Conventions for Calculating Linear Thermal Transmittance and Temperature Factors). In this case, use those calculated Ψ-values along with the length of each junction.

c. Use the individual junction default values in the Standard Assessment Procedure, Table K1.

d. Use a global default value for overall heat losses in the energy calculation to take account of the heat loss due to thermal bridging (a value of 0.20 W/m^{2}K is added to overall elemental losses, making it harder to achieve compliance).

A combination of details can be used and where some details are missing, the Ψ-values from the 'default' column in Technical Guidance Document L Dwellings Table D1 (Ireland) or SAP Table K1 (Northern Ireland) can be used.

The Ψ-values in this document have all been calculated by persons with suitable expertise and experience as required.

Where options (a) or (b), or a combination of them, are used appropriate consideration should be given to on-site audits, inspection, and associated documentation to meet the evidentiary requirements necessary to claim the associated Ψ–value (psi-value) in the energy assessment.

Thermal modelling of junctions

Ψ-values have been created for the major junctions involving Kingspan Kooltherm® K8 Plus boards following the guidelines in BR 497 (Conventions for Calculating Linear Thermal Transmittance and Temperature Factors).

All of the calculated Ψ-values for the Kingspan junction details are better than the default Ψ-values given in Table D1 of Technical Guidance Document L 2022 and SAP Table K1.

Kingspan Insulation thermal modelling

Critical temperature factors

Reasonable provision to avoid surface condensation, or mould growth occurring as a result of thermal bridges, is to demonstrate that the details achieve a temperature factor that is no worse than the performance set out in BRE IP 1/06 (Assessing the effects of thermal bridging at junctions and around openings).

The temperature factor is a property of the construction, surface resistance and internal and external temperatures. It is used to assess the risk of surface condensation or mould growth. This parameter has been provided for all of the junction variants.

In all cases the calculated values are higher than the critical temperature factor for dwellings (fCRsi of 0.75) as given in BRE IP 1/06, which limits the risk of surface condensation or mould growth. Higher humidity condition buildings for example swimming pools (fCRsi of 0.90), may require alternative details and constructions.

All of the modelled Kingspan Kooltherm® K8 Plus details achieve acceptable temperature factors.

How to use these details

The Ψ-values cited may be used in calculations of building heat loss, where the principles of construction and key element specifications have been followed.

Residual cavity widths

When fitting partial fill cavity wall insulation, it is important to check what residual cavity is needed between the outer face of the insulation and the external leaf.

The minimum width for the cavity depends varies depending on project specific factors including the:

- building height
- permeability of the outer construction
- location, specifically the Building Regulations that apply depending on location (the Republic of Ireland or Northern Ireland)
- cavity insulation product being installed
- exposure risk of the property.

Kingspan Kooltherm® K8 Plus has undergone testing to BS 4315-2: 1970 (Methods of test for resistance to air and water penetration. Permeable walling constructions (water penetration)). This can allow it to be fitted with a clear cavity of just 20 mm. A greater clear cavity may be needed in some applications depending on the exposure risk, building height and the type of external construction and finish.

For further advice please refer to the Kingspan Kooltherm® K8 Plus BDA Certification or contact the Kingspan Insulation Technical Service Department (see rear cover).

Limitations & applicability of modelling

Where proposed constructions significantly differ from the diagrams shown, these Ψ-values and temperature factors should not be used. In addition where the product differs or is substituted these details should not be used.

These details represent typical detailing to achieve a good level of thermal performance, however the details included in this document may not be suitable for use in all circumstances. Where there is any uncertainty, NSAI requirements and advice should always be sought and followed. All other site requirements and relevant building regulations must be taken into consideration when implementing the details.

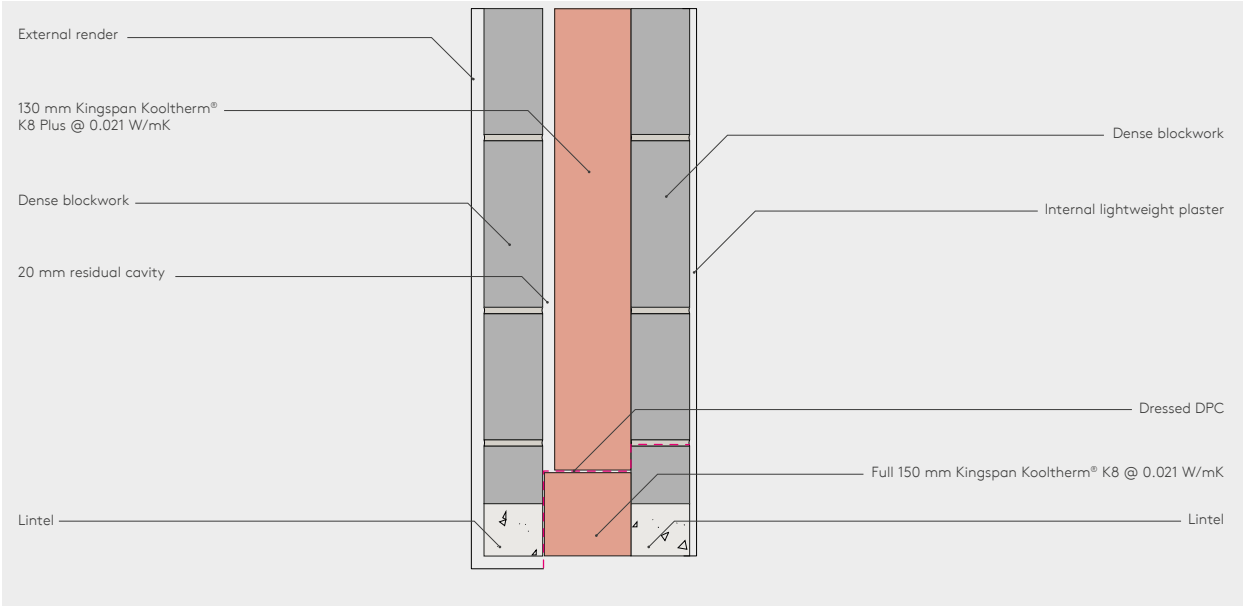
The details and thermal models contained within this document are indicative only, designed to provide a basis for psi-value calculations and thermal junction performance. The actual design and requirements of each project regarding (but not limited to), acoustics, fire, structure, moisture, etc. will need to be determined and checked by the designer, fire engineer and other relevant parties on the project. Although we have made every effort to provide accurate information the company can accept no liability for any issues arising from its use.

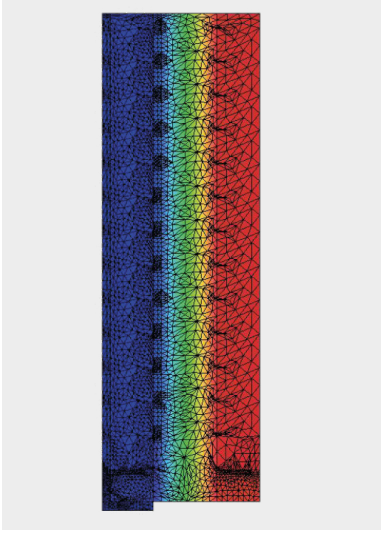
Kingspan Kooltherm® K8 Plus Cavity Board:

- Premium performance rigid thermoset phenolic insulation - thermal conductivities as low as 0.021 W/mK
- 20 mm clear cavity is maintained - resists moisture penetration
- Engineered jointing to resist water ingress
- Achieves European Classification (Euroclass) C-s2,d0
- U-values as low as 0.14 W/m^{2}K achieved in a standard 150 mm cavity
- Low emissivity scrim reinforced foil facings increase the thermal resistance of the cavity
- Unaffected by air infiltration
- Easy to handle and install compared to some other commonly used insulants

Find out more.

1 - Window head





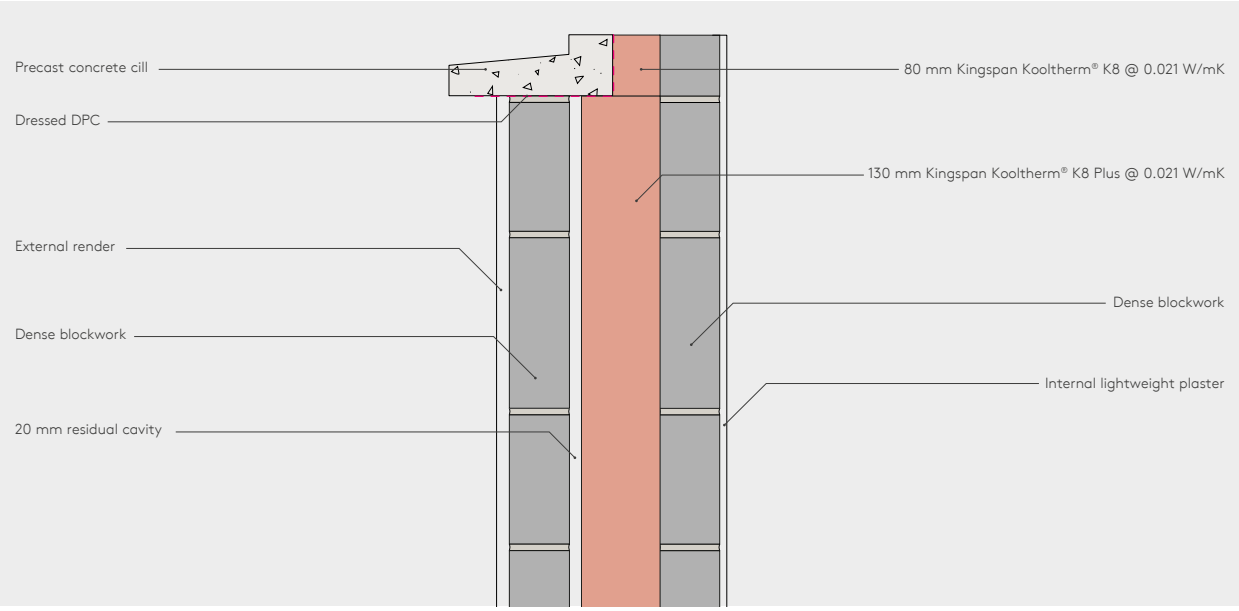
Insulation material	Thermal conductivity (W/mK)
Kingspan Kooltherm® K8 Plus Cavity Board	0.021

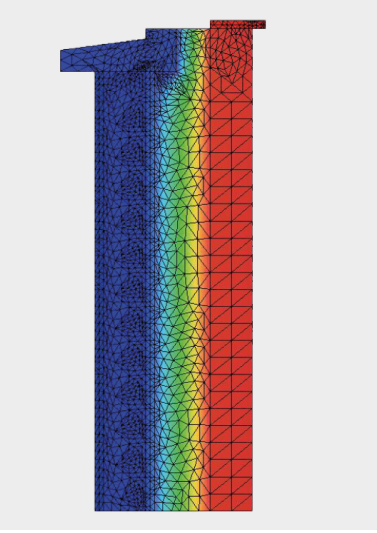
Psi-value calculated in accordance with BR 497: 2016
0.000 W/(mK)

Minimum temperature criteria to BRE IP1/06
f_{Rsi} = 0.97 > 0.75

Scan to download the full CAD detail

2 - Window cill





Insulation material	Thermal conductivity (W/mK)
Kingspan Kooltherm® K8 Plus Cavity Board	0.021

Psi-value calculated in accordance with BR 497: 2016
0.012 W/(mK)

Minimum temperature criteria to BRE IP1/06
f_{Rsi} = 0.96 > 0.75

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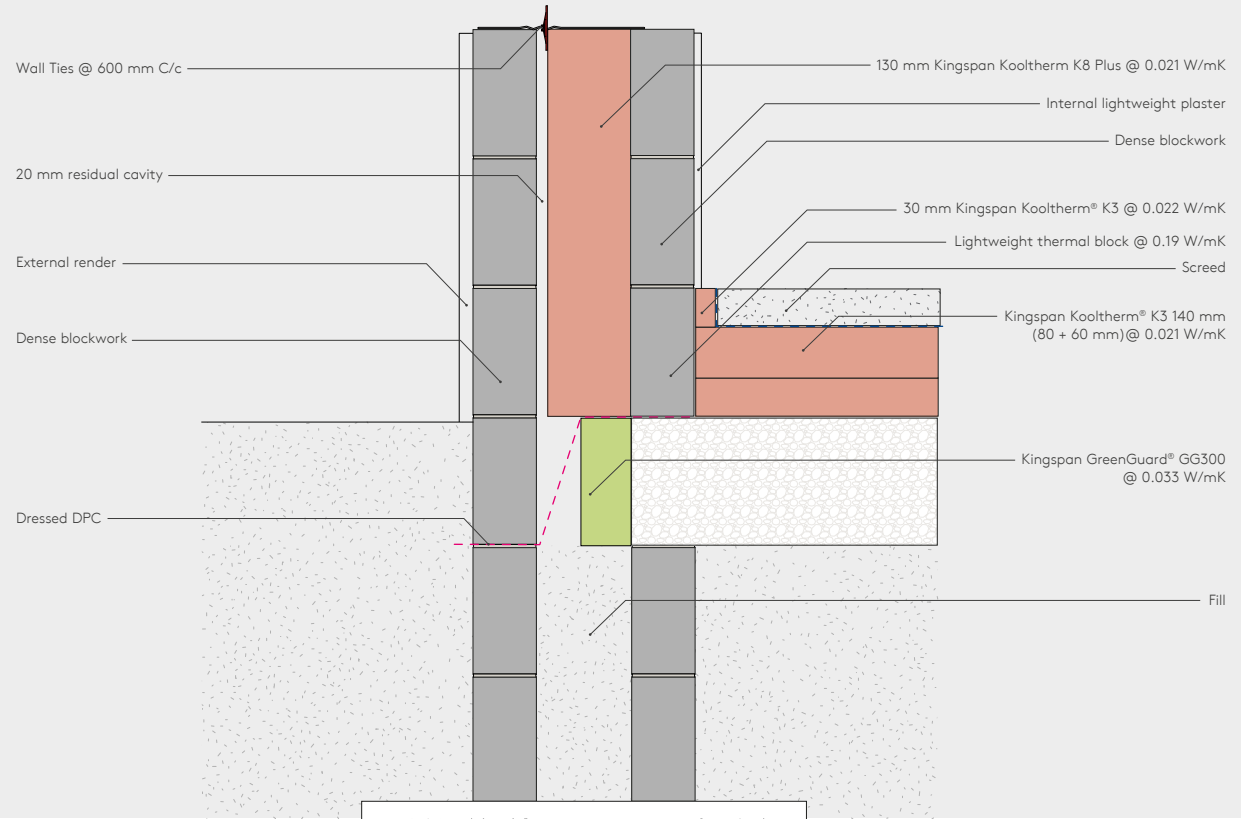
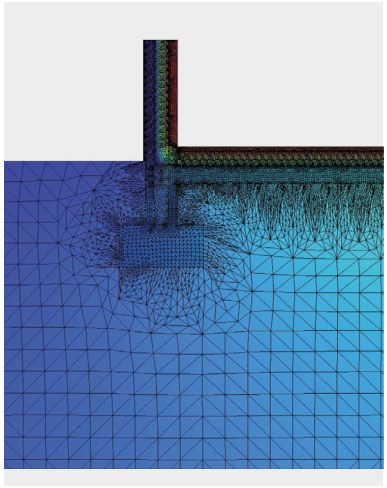
3 - Ground floor perimeter





Insulation material	Thermal conductivity (W/mK)
Kingspan GreenGuard® GG300	0.033
Kingspan Kooltherm® K3 Floorboard (25 - 44 mm)	0.022
Kingspan Kooltherm® K3 Floorboard (45 - 150 mm)	0.021
Kingspan Kooltherm® K8 Plus Cavity Board	0.021

Psi-value calculated in accordance with BR 497: 2016
0.075 W/(mK

Minimum temperature criteria to BRE IP1/06
f_{Rsi} = 0.88 > 0.75

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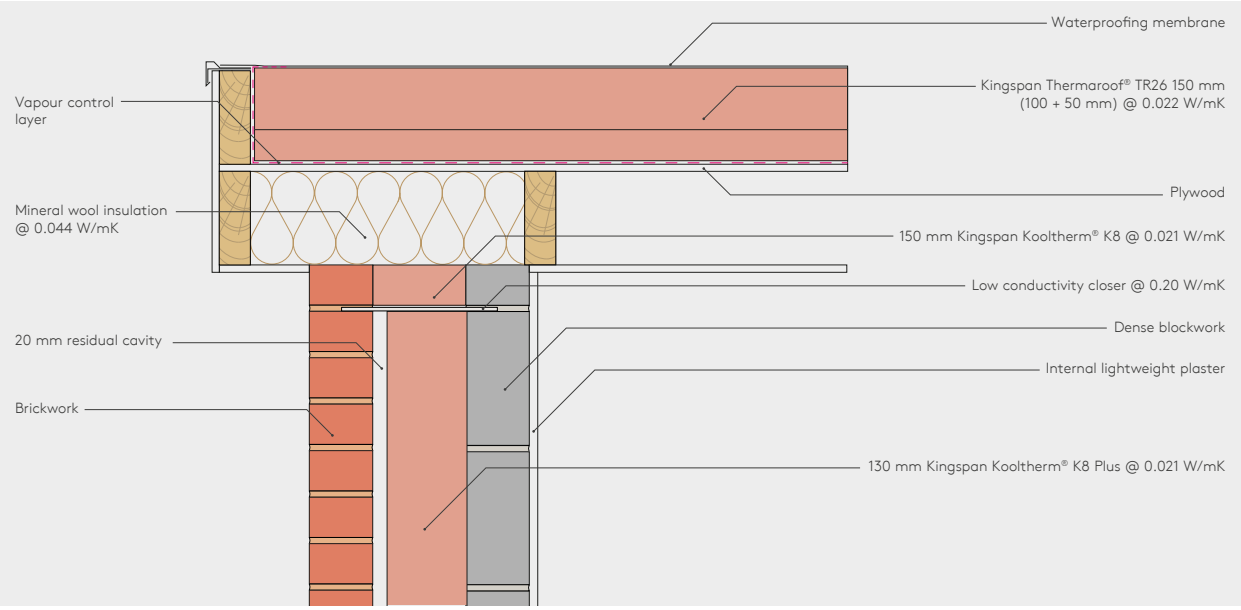
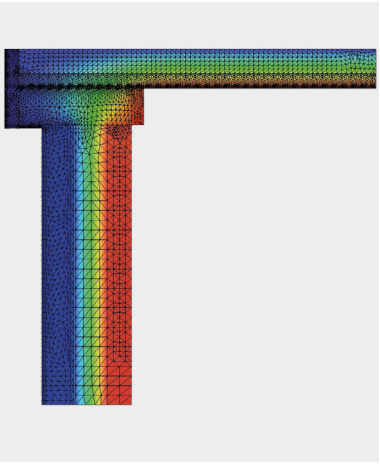
4 - Flat roof





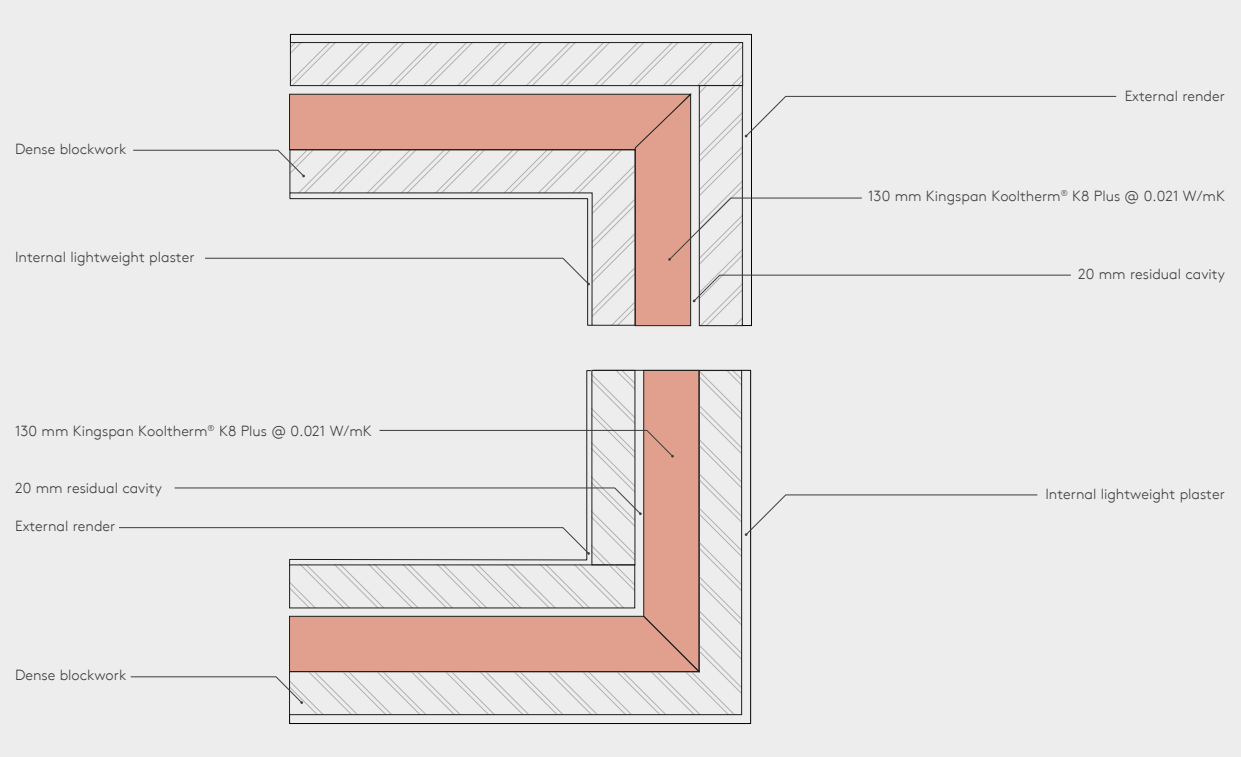
Insulation material	Thermal conductivity (W/mK)
Kingspan Kooltherm® K8 Plus Cavity Board	0.021
Kingspan Kooltherm® K8 Cavity Board	0.021
Mineral wool	0.044
Kingspan Thermaroof® TR26	0.022

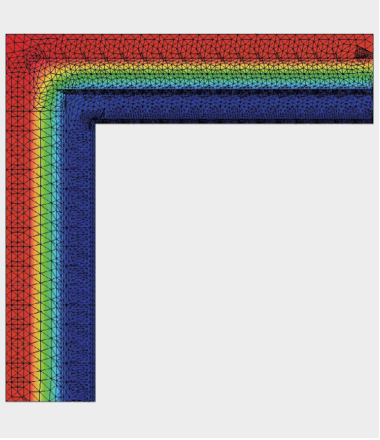
Psi-value calculated in accordance with BR 497: 2016
0.020 W/(mK)

Minimum temperature criteria to BRE IP1/06
f_{Rsi} = 0.92 > 0.75

Scan to download the full CAD detail

5 - Inverted corner





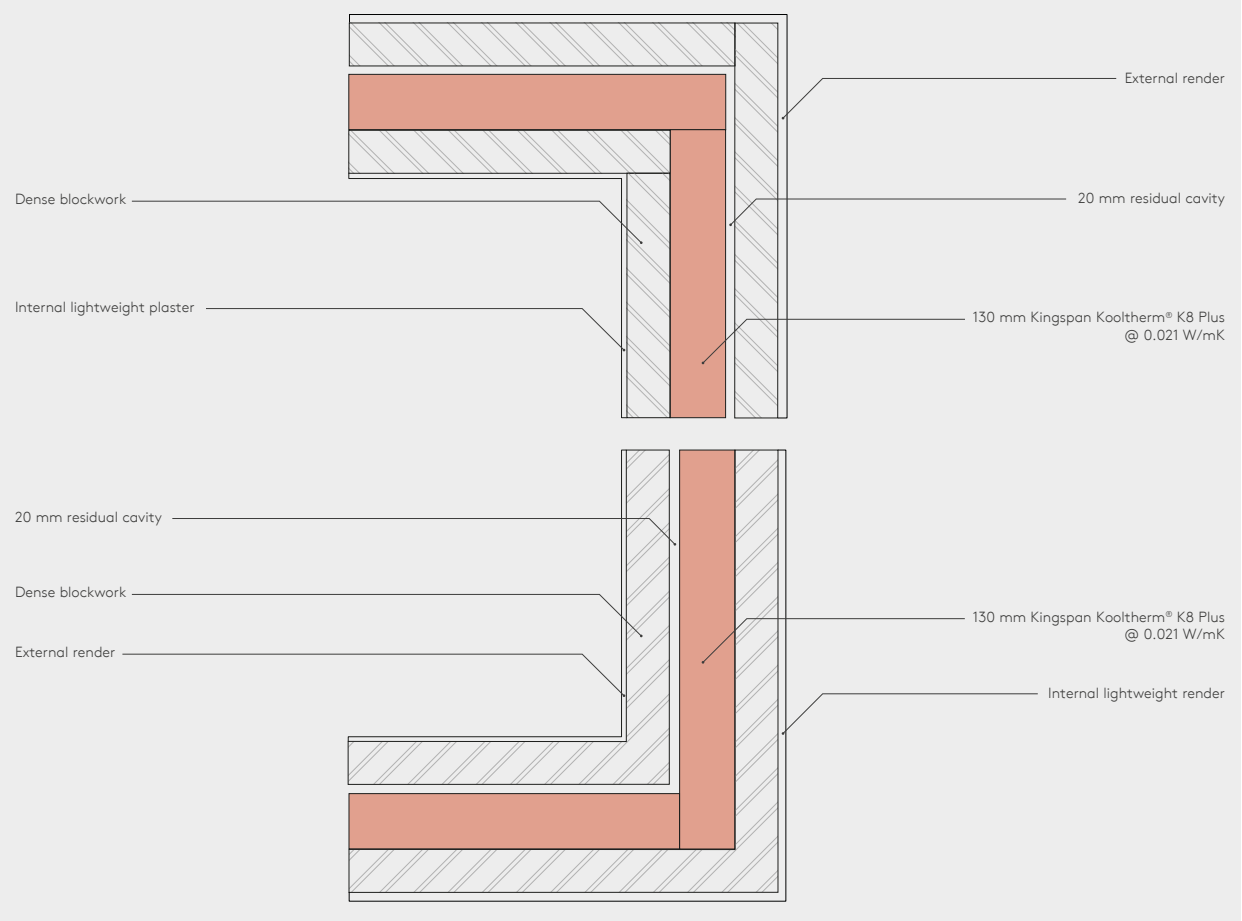
Insulation material	Thermal conductivity (W/mK)
Kingspan Kooltherm® K8 Plus Cavity Board	0.021

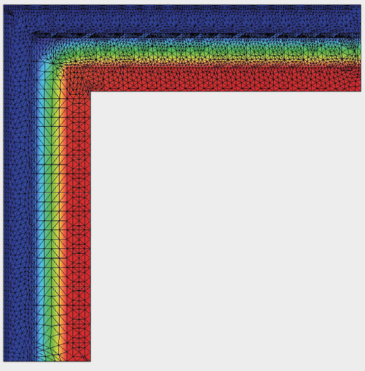
Psi-value calculated in accordance with BR 497: 2016
-0.058 W/(mK)

Minimum temperature criteria to BRE IP1/06
f_{Rsi} = 0.97 > 0.75

Scan to download the full CAD detail

6 - External corner





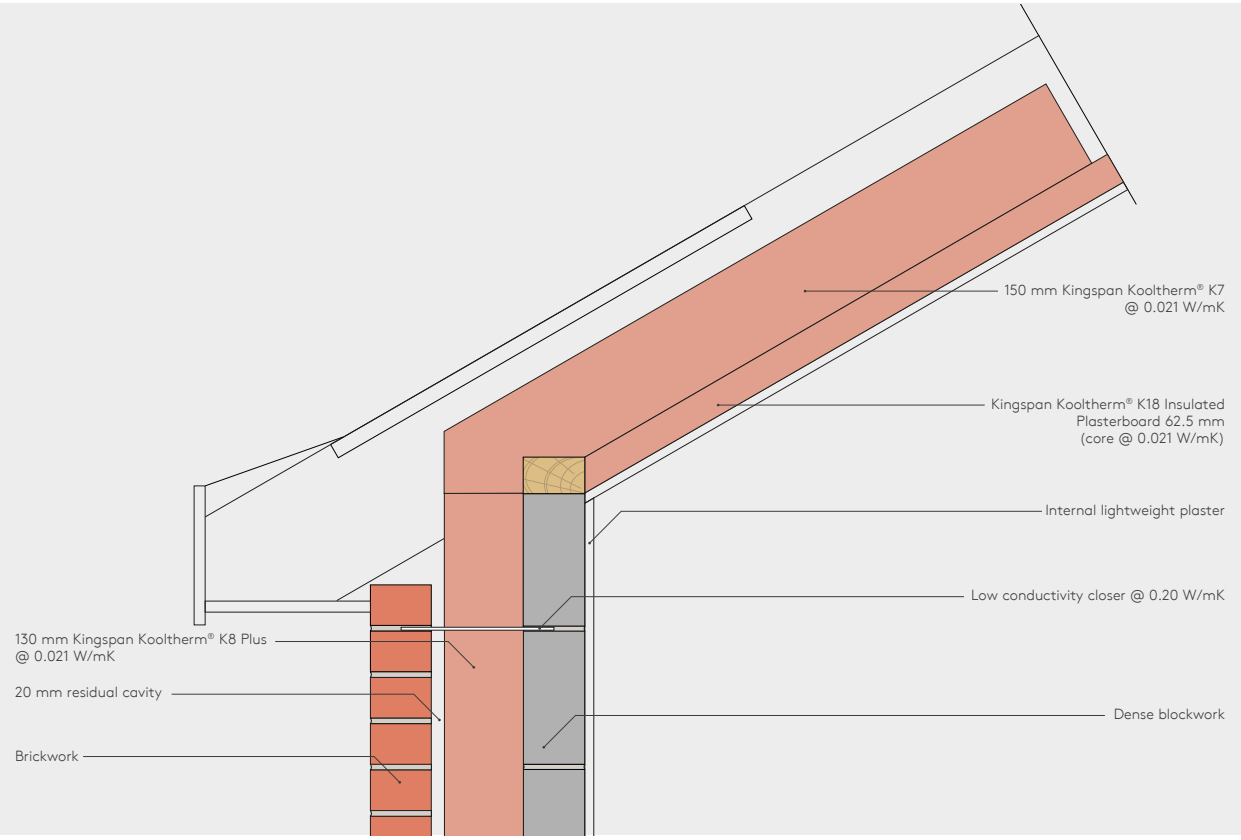
Insulation material	Thermal conductivity (W/mK)
Kingspan Kooltherm® K8 Plus Cavity Board	0.021

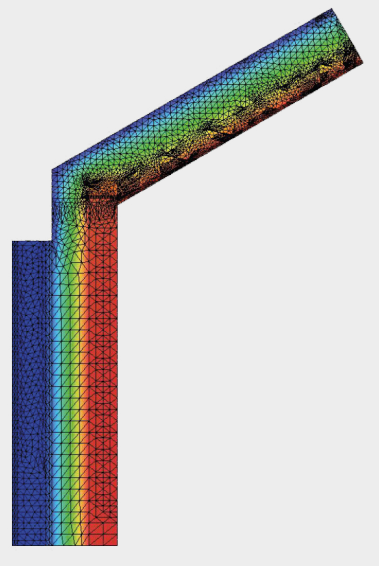
Psi-value calculated in accordance with BR 497: 2016
0.038 W/(mK)

Minimum temperature criteria to BRE IP1/06
f_{Rsi} = 0.94 > 0.75

Scan to download the full CAD detail

7 - Eaves - pitched ceiling





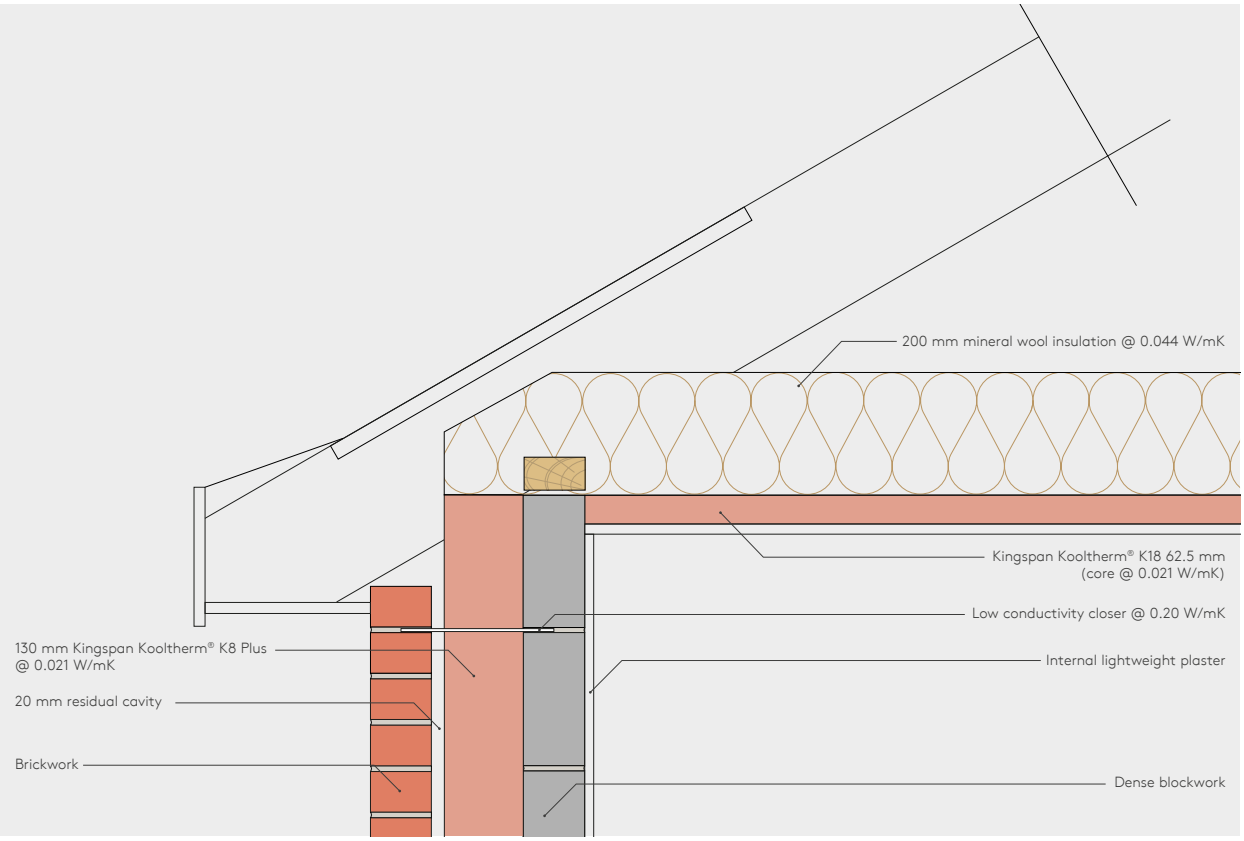
Insulation material	Thermal conductivity (W/mK)
Kingspan Kooltherm® K18 Insulated Plasterboard	0.021
Kingspan Kooltherm® K7 Pitched Roof Board	0.021
Kingspan Kooltherm® K8 Plus Cavity Board	0.021

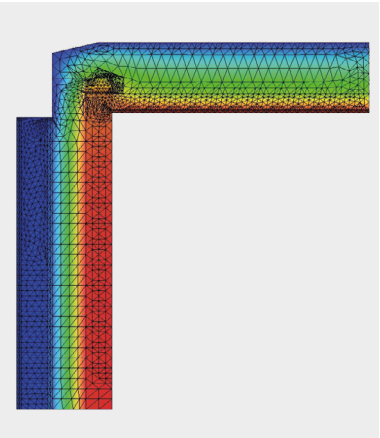
Psi-value calculated in accordance with BR 497: 2016
0.031 W/(mK)

Minimum temperature criteria to BRE IP1/06
f_{Rsi} = 0.93 > 0.75

Scan to download the full CAD detail

8 - Eaves





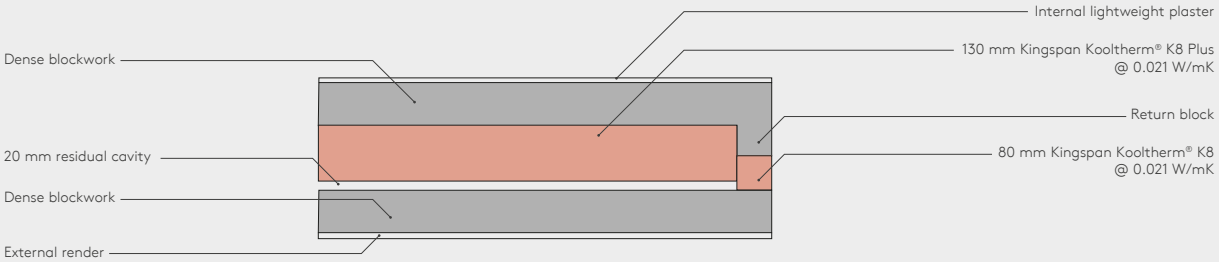
Insulation material	Thermal conductivity (W/mK)
Kingspan Kooltherm® K18 Insulated Plasterboard	0.021
Kingspan Kooltherm® K8 Plus Cavity Board	0.021

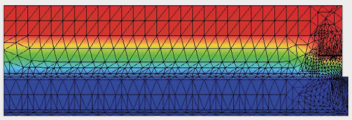
Psi-value calculated in accordance with BR 497: 2016
0.063 W/(mK)

Minimum temperature criteria to BRE IP1/06
f_{Rsi} = 0.89 > 0.75

Scan to download the full CAD detail

9 - Door jamb





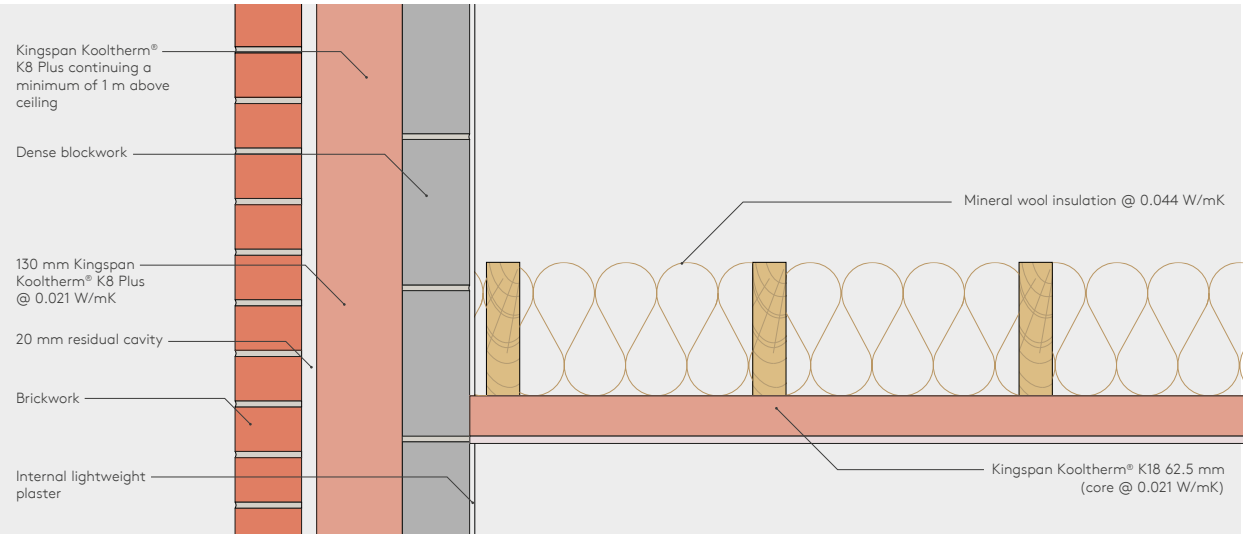
Insulation material	Thermal conductivity (W/mK)
Kingspan Kooltherm® K8 Plus Cavity Board	0.021
Kingspan Kooltherm® K8 Cavity Board	0.021

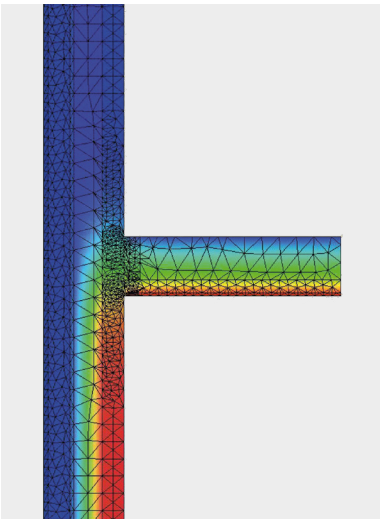
Psi-value calculated in accordance with BR 497: 2016
0.014 W/(mK)

Minimum temperature criteria to BRE IP1/06
f_{Rsi} = 0.95 > 0.75

Scan to download the full CAD detail

10 - Attic floor level





Insulation material	Thermal conductivity (W/mK)
Kingspan Kooltherm® K18 Insulated Plasterboard	0.021
Kingspan Kooltherm® K8 Plus Cavity Board	0.021

Psi-value calculated in accordance with BR 497: 2016
+0.265 W/mK

Minimum temperature criteria to BRE IP1/06
f_{Rsi} = 0.77 > 0.75

Scan to download the full CAD detail

About Kingspan Insulation

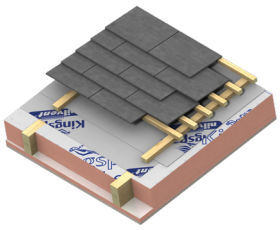
Products & solutions

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

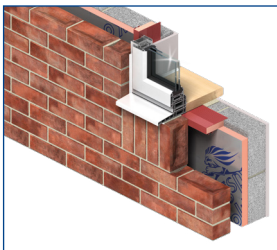
- Kingspan AlphaCore® – microporous silica-based insulation.
- Kingspan OPTIM-R® – vacuum insulation panel (VIP) systems.
- Kingspan Kooltherm® – phenolic insulation.
- Kingspan Therma™ – PIR insulation.
- Kingspan K-Roc® – rock mineral fibre insulation.
- Kingspan GreenGuard® – extruded polystyrene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

About Kingspan Insulation

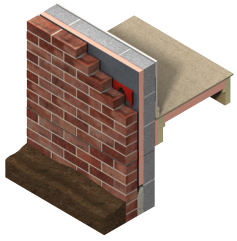
From new housing developments to refurbishing your home, we offer a number of different solutions for roof, wall and floor applications.



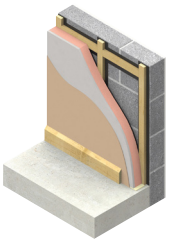
Insulation for tiled or slated pitched warm roof spaces



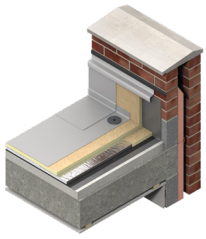
Insulated extrusions for closing wall cavities at openings



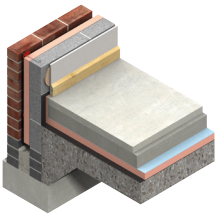
Full and partial fill cavity wall insulation



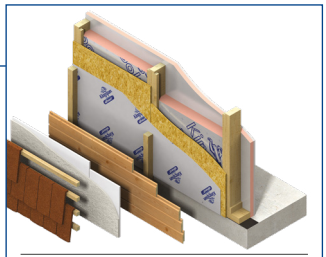
Insulation for tiled or slated pitched warm roof spaces



Insulation for flat roofs and terraces



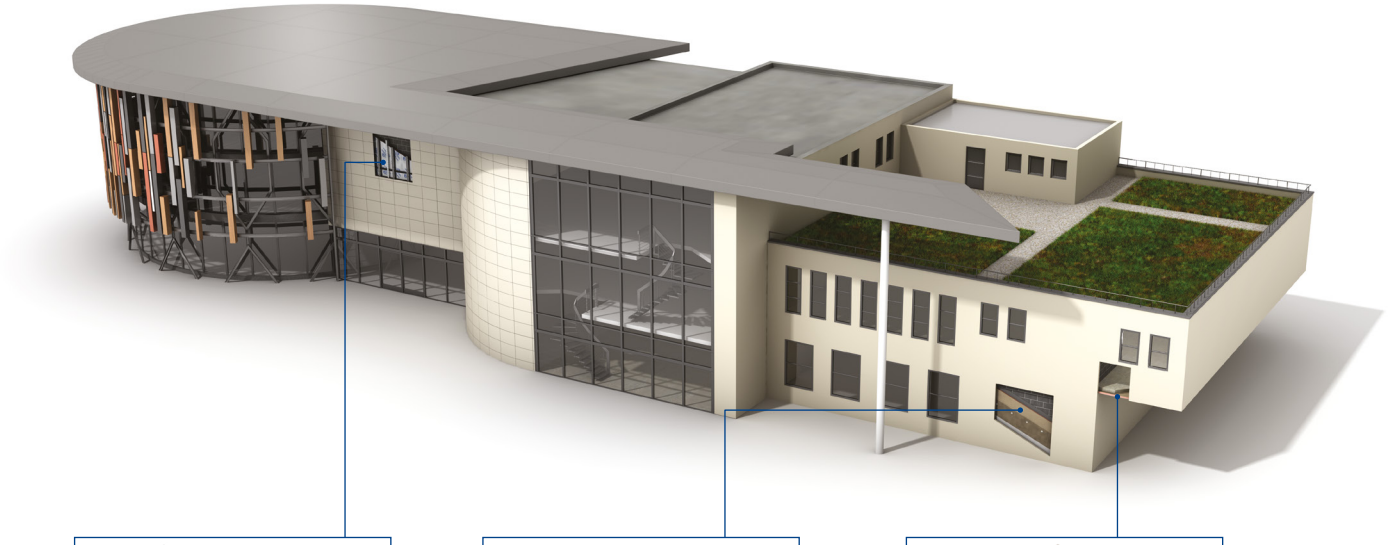
Insulation for floors

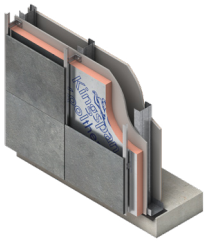


Insulation for timber and steel framing systems

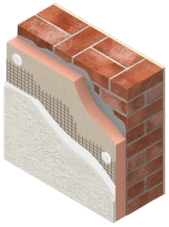
About Kingspan Insulation

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

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 site in Castleblayney, Ireland, is accredited to the independent compliance standard ISO 37301: 2021.

Kingspan Insulation, Castleblayney

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.

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

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E: info@kingspaninsulation.ie
www.kingspaninsulation.ie

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

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

For the most up-to-date version of this brochure please scan or click here.

To access pre-existing product information or information relating to previously sold/discontinued products please email literature@kingspaninsulation.ie

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