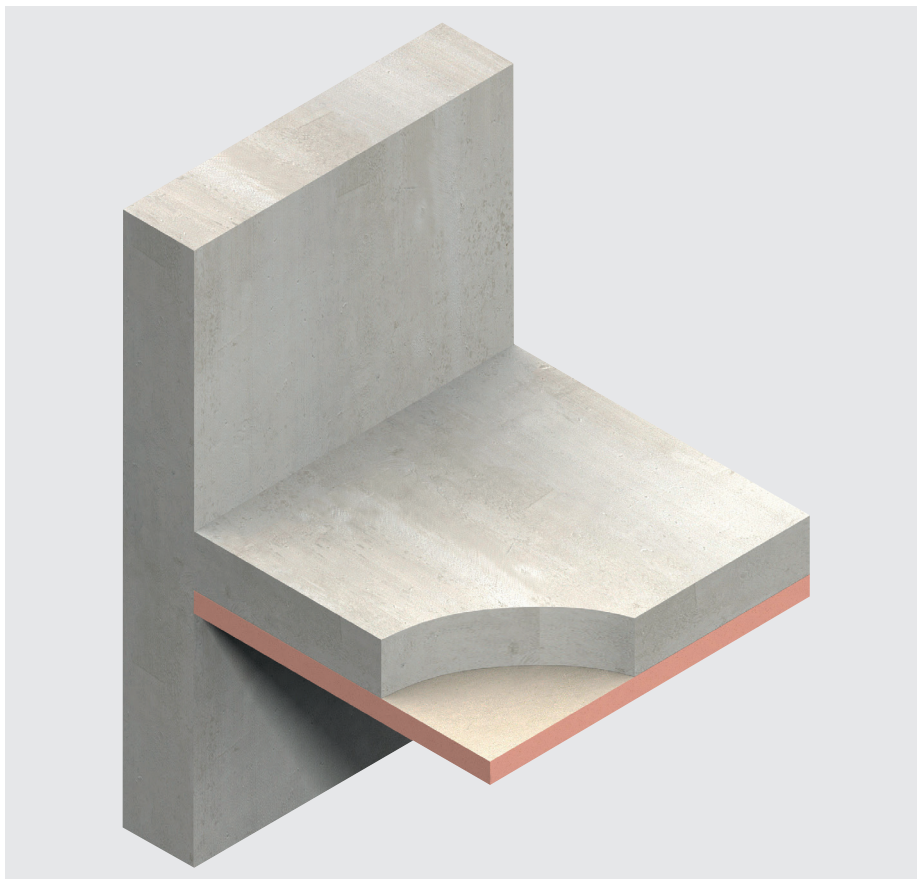


Kooltherm® K10 Soffit Board

Insulation for structural ceilings (soffits)



- Premium performance rigid thermoset phenolic insulation - thermal conductivities as low as 0.021 W/mK
- For FM approval, see page 7
- Unaffected by air infiltration
- Resistant to the passage of water vapour
- Easy to handle compared to some other commonly available insulants
- Ideal for new build and refurbishment

Typical constructions and U-values

Assumptions

The U-values in Table 1 have been calculated using the method detailed in EN ISO 6946: 2017 (Building components & building elements. Thermal resistance & thermal transmittance. Calculation methods). They are valid for the construction shown in Figure 1.

These examples are based on the use of Kingspan Kooltherm® K10 mechanically fixed directly to the soffit of a 200 mm concrete deck using 3 metal fixings, with a cross-sectional area of 12.32 mm, a thermal conductivity of 50 W/mk and 8 thermally broken fasteners with a thermal conductivity of 1.00 W/mK or less, the effect of which is insignificant.

NB When calculating U-values to EN ISO 6946: 2017, the type of fixing used may change the thickness of insulation required. Please contact the Kingspan Insulation Technical Service Department (see rear cover for details) for a comprehensive U-value calculation, which will take account of the correction factor specific to the fixing.

NB For the purposes of these calculations the standard of workmanship has been assumed good, and therefore the correction factor for air gaps has been ignored.

NB The figures quoted are for guidance only. A detailed U-value calculation and a condensation risk analysis should be completed for each project.

NB If your construction is different from those specified, and / or to gain a comprehensive U-value calculation along with a condensation risk analysis of your project, contact the Kingspan Insulation Technical Service Department (see rear cover for details) for assistance.

U-value table key

Further information on the applicable notional and area weighted average limiting U-values is available in the relevant geographical documentation:

- Technical Guidance Document L (Dwellings) and Technical Guidance Document L (Buildings other than Dwellings) to the Building Regulations for the Republic of Ireland
- Technical Booklets F1 & F2 to the Building Regulations for Northern Ireland.

Fixed directly to concrete soffit

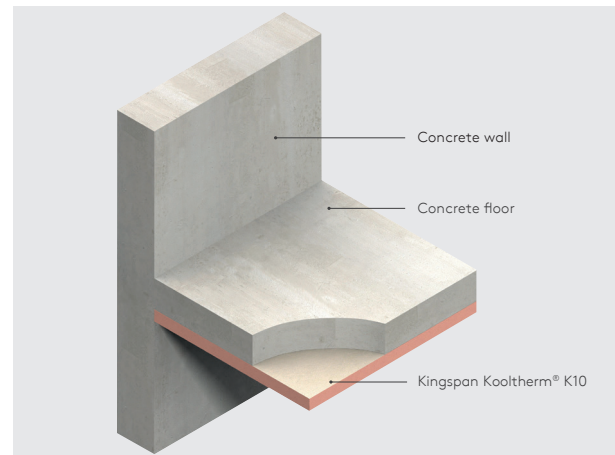


Figure 1

Insulant thickness (mm)	U-values (W/m ² K)
50	0.37
60	0.31
70	0.27
80	0.24
90	0.22
100	0.20
120	0.16
130	0.15
140*	0.14
150*	0.13
170*	0.12

* Supplied in two layers.

Design considerations

Heat loss and linear thermal bridging

Basic principles

Linear thermal bridging describes the additional heat losses or gains that occur at junctions between elements e.g. where a cavity wall meets the ground or intermediate floor, 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 internal surface 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. This is 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 Dwelling Energy Assessment Procedure (DEAP) or the Non-Domestic Energy Assessment Procedure (NEAP) that are used to assess the operational CO₂ emissions and, where applicable, the fabric energy efficiency of buildings.

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

Approved details, such as the Acceptable Construction Details (Republic of Ireland), can uplift performance to provide a clear starting point towards achieving compliance, but they are limited in scope and applicability. The greatest opportunity for mitigating the impact of linear thermal bridges can come from following accurately 'modelled' details that take into account the following design considerations.

Reducing linear thermal bridging

For soffit constructions, supporting beams and columns interrupting the insulation layer can represent significant thermal bridges, which can adversely affect the thermal performance of the floor if not suitably handled. Thermally, the best approach is to fully box around beams with appropriate insulation to limit these losses. For further advice on reducing linear and point thermal bridging, please contact Kingspan Insulation's Technical Service Department (see rear cover for details).

Responsible sourcing

Kingspan Kooltherm® K10 produced at Kingspan Insulation's Castleblayney, County Monaghan's manufacturing facility is manufactured under a management system certified to ISO 14001: 2015.

The above information is correct at the time of writing. Please confirm at the point of need by contacting Kingspan Insulation's Technical Service Department, from which a copy 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.

Specification clause

Kingspan Kooltherm® K10 should be described in specifications as:

The soffit insulation shall be Kingspan Kooltherm® K10 Soffit Board _____ mm thick: comprising a premium performance fibre-free rigid thermoset phenolic insulation core with a glass tissue based facing on its inner face and a low emissivity composite foil on its outer face. 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.

Wind loading

Where the insulation boards may be subject to external wind pressure, wind loadings should be assessed in accordance with EN 1991-1-4: 2005 + A1: 2010 (National Annex to Eurocode 1 Actions on Structures. General Actions. Wind Actions) taking into account:

- length / width / height of the building
- orientation of the building
- wind speed
- aspect (i.e. on a hill side)
- topographical value of the surrounding area.

Lightning protection

Building designers should give consideration to the requirements of BS / I.S. EN 62305: 2011 - 2012 (Protection against lightning).

Sitework

Fixing directly to concrete soffits

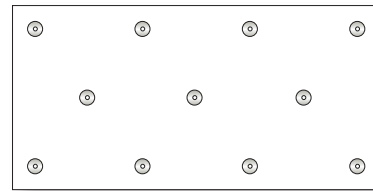
The installation guidance for Kingspan Kooltherm® K10 outlined in this section must only be followed after considering the below.

- Insulation boards should be installed break-bonded, with joints lightly butted.
- The number of mechanical fixings required to fix Kingspan Kooltherm® K10 will vary with the geographical location of the building, the local topography, the height and width of the soffit concerned, and the soffit construction.
- A minimum of 11 mechanical fixings, with a minimum head diameter of 25 mm, are required to secure the insulation board to the soffit.
- Where the insulation boards may be subject to external wind pressure, the requirement for additional fixings should be assessed in accordance with EN 1991-1-4: 2005 + A1: 2010 (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, and must offer a minimum 40 mm penetration into a solid substrate.
- Please refer to the column opposite 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.
- Depending upon the fixing type, insulation boards can also be fitted by a shot fired fixing method, which can result in significantly faster installation times. All of the guidance above still applies.
- For details on fixings refer to:

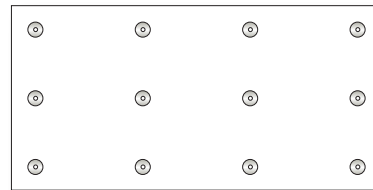
MAK Fasteners www.makfasteners.com	+353 (0) 1 451 9900
Masonry Fixings Services Ltd www.masonryfixings.ie	+353 (0) 1 642 6789
Ejot UK Limited www.ejot.co.uk	+44 (0) 1977 687 040
Fixfast www.fixfast.com	+44 (0) 1732 882 387
ITW Spitz www.itwcp.co.uk	+44 (0) 800 731 4924
SFS Intec www.sfsintec.biz/uk	+44 (0) 330 0555 888

Recommended fixing patterns

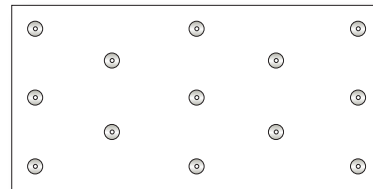
- The images below show recommended fixing patterns, the number of fixings used and the resultant fixing density (number of fixings per m²).
- The fixing patterns shown are suitable for continuous flat (even) decks only. For non-continuous decks please contact the Kingspan Insulation Technical Service Department (see rear cover) for further guidance.



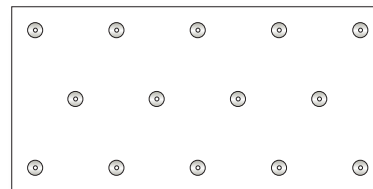
11 no. per board
(2.4 x 1.2 m board - 3.81 fixings / m²)



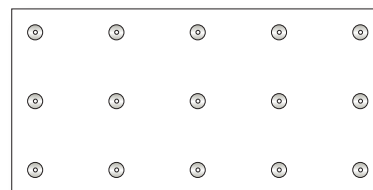
12 no. per board
(2.4 x 1.2 m board - 4.16 fixings / m²)



13 no. per board
(2.4 x 1.2 m board - 4.51 fixings / m²)



14 no. per board
(2.4 x 1.2 m board - 4.86 fixings / m²)



15 no. per board
(2.4 x 1.2 m board - 5.20 fixings / m²)

Sitework

Proprietary grid systems

- For information regarding proprietary grid system specifications, please contact the Kingspan Insulation Technical Service Department (see rear cover).

Taping

- The joints of Kingspan Kooltherm® K10 should always be taped using a suitable 70 mm min. wide self-adhesive aluminium foil tape, with a 50 mm min. wide overlap onto the insulation board face (Figure 2).
- In the absence of other protection, exposed edges of Kingspan Kooltherm® K10 should be protected by a suitable self-adhesive aluminium foil tape, with a 50 mm min. wide overlap onto the insulation board face (Figure 2).
- For advice on the specification of self-adhesive aluminium foil tape and application guidelines, refer to:

ProTech Global Ltd: +44 (0) 1934 318 468
www.protechglobal.co.uk

Bostik Limited +44 (0) 1785 272 727
www.bostik.co.uk

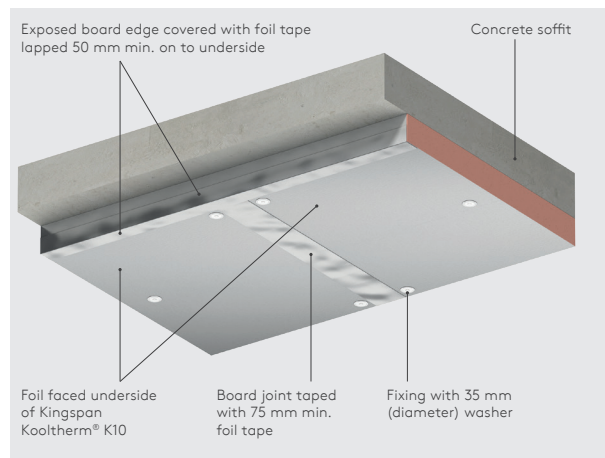


Figure 2 - Protection of exposed insulation edges of Kingspan Kooltherm® K10

General

Cutting

- Cutting should be carried out either by using a fine toothed saw or 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.

Availability

- Kingspan Kooltherm® K10 is available through specialist insulation distributors and selected builders' merchants throughout Ireland.

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 and safe to use.
- A Safety Information Data Sheet for this product is available from the Kingspan Insulation website 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.

Product Details

The inner facing

The inner (concealed) facing of Kingspan Kooltherm® K10 is a glass tissue based facing, autohesively bonded to the insulation core during manufacture.

The core

The core of Kingspan Kooltherm® K10 is a premium performance rigid thermoset fibre-free phenolic insulant.



The outer facing

The outer (exposed) facing of Kingspan Kooltherm® K10 is a low emissivity composite foil, autohesively bonded to the insulation core during manufacture. The exposed facing used on Kingspan Kooltherm® K10 has not been designed with the purpose of an aesthetic finish as its primary function. Where appearance is critical, advice should be sought from Kingspan Insulation's Technical Service Department (see rear cover).

Standards & approvals

Kingspan Kooltherm® K10 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 & safety management systems) and ISO 50001: 2018 (Energy management systems).

The use of Kingspan Kooltherm® K10 produced at Kingspan Insulation's Castleblayney, County Monaghan manufacturing facility (in thicknesses of 75 - 140 mm) is covered by NSAI Agreement Certificate 08/0321 and BBA Certificate 14/5134.



Standard dimensions

Kingspan Kooltherm® K10 is available in the following standard size:

Nominal dimension		Availability
Length	(m)	2.4
Width	(m)	1.2
Insulant thickness	(mm)	Refer to local distributor or Kingspan Insulation for current stock and non-stock sizes.

Compressive strength

The average compressive strength of Kingspan Kooltherm® K10 exceeds 100 kPa, when tested to EN 826: 2013 (Thermal insulating products for building applications. Determination of compression behaviour).

Durability

If correctly installed, Kingspan Kooltherm® K10 can have an indefinite life. Its durability depends on the supporting structure and the conditions of its use.

NB If the building is considered to be in an exposed location advice should be sought from the Kingspan Insulation Technical Service Department to determine the product's suitability.

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 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® K10 resist attack by mould and microbial growth, and do not provide any food value to vermin.

Product Details

FM Approval

Kingspan Kooltherm® K10 is FM Approved to FM 4880 (Examination Standard for Class 1 Fire Rating of Building Panels or Interior Finish Materials) November 2022. Kooltherm® K10 (thicknesses up to, and including, 120 mm) produced at Kingspan Insulation's Castleblayney, County Monaghan's manufacturing facility is FM Approved.



This approval is valid for ceiling / soffit insulation only, with non-combustible walls with no height restriction. For the purpose of FM Approval, the Kooltherm® K10 entire product thickness and exposed facer should be fastened to the supporting structural soffit with metal mechanical fasteners & washer plates with minimum 50 mm wide aluminium tape over joints. For mechanical reasons the fixing specification given on page 4 of this document and the taping specification on page 5 must still be followed.

Not all thicknesses are covered by the FM Approval when fixed in a ceiling / soffit position. Further details of the current FM Approval can be located on the FM Approvals online listing website 'Approval Guide' at www.fmapprovals.com/approval-guide or www.approvalguide.com by searching 'Kooltherm K10' or alternatively contact the Kingspan Insulation Technical Service Department (see rear cover).

Fire Performance

Kingspan Kooltherm® K10 achieves European Classification (Euroclass) C-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).

Test report number	EUI-22-SBI-000057-B EUI-22-SFB-000057-B, EUI-22-SBI-000087-A, EUI-22-SFB-000087-A
Classification report number	EUI-22-000057-B-Revision 1
Product thickness (mm)	25 - 130
Substrate	Valid with any substrate, except plasterboards, of at least A2-s1,d0 class and at least 652.5 kg/m ³ density
Joints / edges	Vertical and horizontal joints and any edge type

Kingspan Kooltherm® K10 is assessed under Assessment and Verification of Constancy of Performance (AVCP) System 1 for Reaction for Fire.

Certificate of Constancy of Performance	1812-CPR-1991
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Further details on the fire performance of Kingspan Insulation products may be obtained from Kingspan Insulation's Technical Service Department.

Thermal properties

The λ -values and R-values detailed below are quoted in accordance with 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: 0.022 W/mK (insulant thickness 25 - 44 mm); and 0.021 W/mK (insulant thickness 45 - 130 mm).

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 (m²K/W).

Insulant Thickness (mm)	Thermal Resistance (m ² K/W)
25	1.10
30	1.35
40	1.80
50	2.35
60	2.85
70	3.30
80	3.80
90	4.25
100	4.75
120	5.70
130	6.15

NB Kingspan Insulation's maximum available single insulation thickness is subject to alteration without notice. At the time of publication, this specific insulation thickness must be built up from two thinner layers, but this may have changed by the time that the information in this literature is relied upon. Please contact Kingspan Insulation's Sales Department sales@kingspaninsulation.ie for current stock and non-stock sizes. Where multiple layers of insulation of different thicknesses are used, the thickest layer should be installed as the outermost layer in the construction.

Contact details

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.kingspan.com/ie/en/contact-us



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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