Insulation
Great Britain

Eleventh Issue | 05/2025

Kooltherm® K103 Floorboard

Insulation for floors

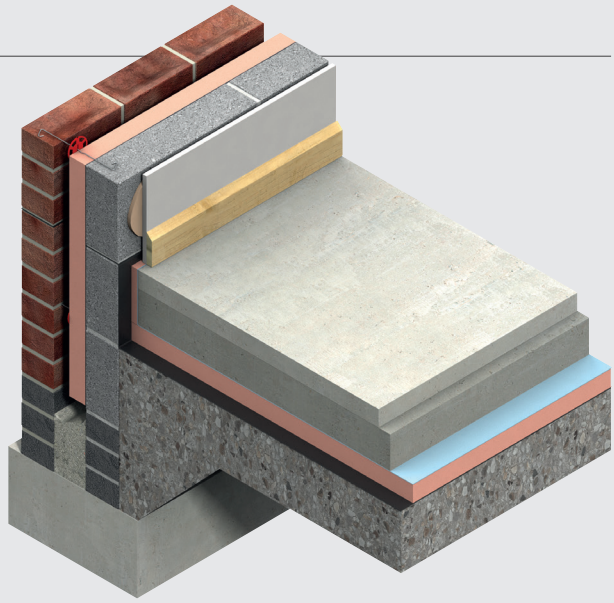
EVEN THINNER EVEN BETTER LOWER

Kingspan®

Contents

Introduction

- Premium performance rigid thermoset phenolic insulation - thermal conductivity of 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



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

Useful links

Website

Kingspan Kooltherm® K103 webpage

Certification

Kingspan Kooltherm® K103 BBA Certificate (thicknesses of 25 – 150 mm)
Kingspan Kooltherm® K103 Certificate of Constancy of Performance (EU)

Declaration of Performance (DoP)

Kingspan Kooltherm® K103 Declaration of Performance (UKDoP)
Kingspan Kooltherm® K103 Declaration of Performance (CPR)

Safety information

Kingspan Kooltherm® product safety information

Product details

The facings

Kingspan Kooltherm® K103 produced at Kingspan Insulation's Pembridge, Herefordshire manufacturing facility is faced on both sides with a glass tissue based facing, autohesively bonded to the insulation core during manufacture.

The core

The core of Kingspan Kooltherm® K103 is a premium performance fibre-free rigid thermoset phenolic insulant.

Standards & approvals

Kingspan Kooltherm® K103 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).

The use of Kingspan Kooltherm® K103 (in thicknesses of 25 - 150 mm), produced at Kingspan Insulation's Pembridge, Herefordshire manufacturing facility is covered by BBA Certificate 16/5299.

Standard dimensions

Kingspan Kooltherm® K103 is available in the following standard size(s):

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

Compressive strength

The compressive strength of Kingspan Kooltherm® K103 is 120 kPa, when tested to BS EN 826: 2013 (Thermal insulating products for building applications. Determination of compression behaviour).

Water vapour resistivity

Kingspan Kooltherm® K103 produced at Kingspan Insulation's Pembridge, Herefordshire manufacturing facility typically achieves a resistivity greater than 370 MNs/gm, when tested in accordance with BS EN 12086: 2013 (Thermal insulating products for building applications. Determination of water vapour transmission properties).

Durability

If correctly installed, Kingspan Kooltherm® K103 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® K103 resist attack by mould and microbial growth, and do not provide any food value to vermin.

Product Details

Fire performance

Kingspan Kooltherm® K103 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). Please see the table below for futher test information, conditions and field of application.

Test report number	EFR-22-002926-SBI EFR-22-002926-SF
Classification report number	EFR-22-002926
Product thickness (mm)	25 - 150
Substrate	Valid mechanically fixed on all substrates classified as A1 or A2-s1,d0 with density ≥652.5 kg/m^3, except gypsum plasterboard substrates
Joints / edges	Valid without joints or without vertical and/or horizontal joints

Kingspan Kooltherm® K103 is assessed under Assessment and Verification of Constancy of Performance (AVCP) System 1 for Reaction to Fire.

The certificate numbers for constancy of performance are 1812-CPR-2093 (EU) and 2822-UKCA-CPR-0094 (UK).

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

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^{2}K/W).

Insulant thickness (mm)	Thermal resistance (m^{2}K/W)
25	1.30
40	2.10
50	2.60
60	3.15
70	3.65
75	3.90
80	4.20
90	4.70
100	5.25
120	6.30
130	6.80
140	7.35
150	7.85

NB Refer to local distributor or Kingspan Insulation price list for current stock and non-stock sizes.

Typical constructions and U-values

Assumptions

The U-values in the tables that follow have been calculated using the method detailed in BS EN ISO 13370: 2017 (Thermal performance of buildings. Heat transfer via the ground. Calculation methods), and using the conventions set out in BR 443 (Conventions for U-value calculations). They are valid for the constructions shown in the details immediately above each table.

Unlike roofs, walls and intermediate floors, U-value calculations for ground floors cannot be calculated with reference to the construction detail alone. Heat loss from ground floors depends upon the ratio of the exposed floor perimeter to the total floor area, the thickness of any basement wall and the depth of any basement.

Floor dimensions should be measured between the finished internal surfaces of the external walls. Non-usable heated space such as ducts and stairwells should be included when determining the area of the floor. Unheated spaces outside of the insulated fabric, such as attached garages or porches, should be excluded when determining the area of the floor. However, the length of the wall between the heated building and the unheated space should be included when determining the perimeter. The floor dimensions of semi-detached, terraced or other joined premises / dwellings can be taken either as those of the premises / dwelling itself or those of the whole building. Where extensions to existing buildings are under consideration, the floor dimensions should be taken as those of the extension.

If the P/A ratio lies between two of the numbers shown in the tables that follow, for a safe estimate, please use the P/A ratio shown that is the next highest i.e. for 0.57 use 0.6.

For buildings with relatively small ground floor areas (primarily domestic properties), if the ground floor is left uninsulated, the thermal performance will be poor. To enhance the thermal performance, complete insulation of the ground floor should be adopted (Figures 1 & 7).

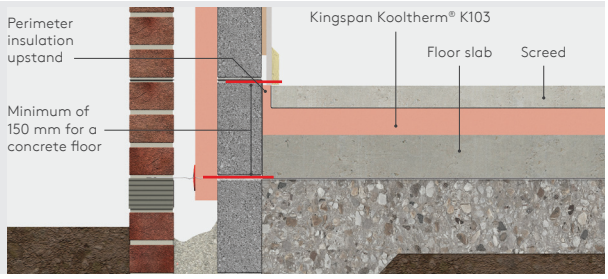


Figure 1: Complete masonry floor insulation

For buildings with large ground floor areas (primarily non-domestic properties), complete insulation of the ground floor may be unnecessary. Insulating the perimeter may provide adequate thermal performance (Figure 2). For further advice on the width of the perimeter insulation please consult Kingspan Insulation's Technical Service Department (see rear cover).

Calculations in the tables that follow assume complete insulation of the floor area, please consult Kingspan Insulation's Technical Service Department (see rear cover) for calculations with perimeter strip insulation only.

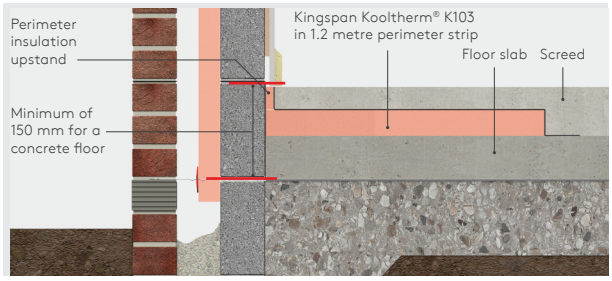


Figure 2: Perimeter strip masonry floor insulation

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

NB For the purposes of these calculations, using the method as detailed in BS EN ISO 13370: 2017, the soil has been assumed to be sand or gravel, the wall insulation is assumed to overlap the floor insulation by minimum 150 mm for a concrete floor and 200 mm for a timber floor, and the standard of workmanship has been assumed good, and therefore the correction factor for air gaps has been ignored.

NB If your construction is different from those specified, and / or to gain a comprehensive U-value calculation for your project, please consult the Kingspan Insulation Technical Service Department for assistance (see rear cover).

U-value table key

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

- Approved Documents L to the Building Regulations for England;
- Approved Documents L to the Building Regulations for Wales and
- Technical Handbooks Section 6 to the Building Standards for Scotland.

Typical constructions and U-values

Beam and dense* block ground floors

Insulation below the floor screed

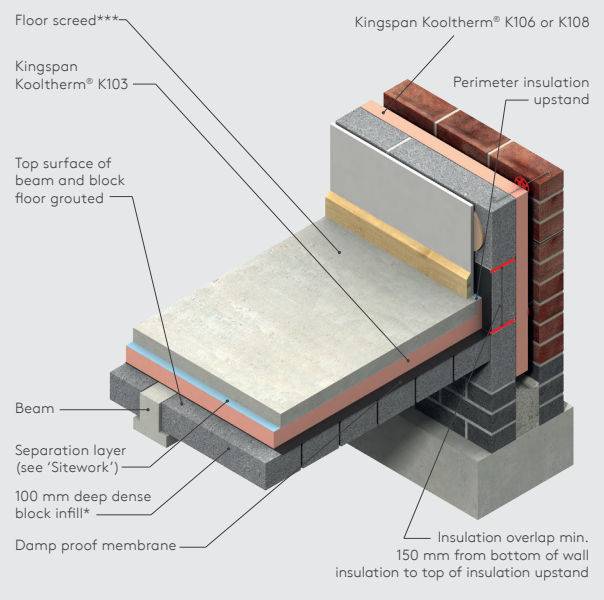


Figure 3

U-values (W/m²K) for various thicknesses of Kingspan Kooltherm® K103 and floor perimeter / area ratios						
Insulant thickness (mm)	Perimeter / area (m^{-1})					
	0.2	0.3	0.4	0.5	0.6	0.7
25	0.29	0.33	0.36	0.38	0.39	0.41
40	0.24	0.26	0.28	0.29	0.30	0.31
50	0.21	0.23	0.24	0.25	0.26	0.26
60	0.19	0.21	0.21	0.22	0.23	0.23
70	0.17	0.19	0.19	0.20	0.20	0.21
75	0.16	0.18	0.18	0.19	0.19	0.20
80	0.16	0.17	0.18	0.18	0.18	0.19
90	0.15	0.16	0.16	0.17	0.17	0.17
100	0.13	0.14	0.15	0.15	0.15	0.16
120	0.12	0.12	0.13	0.13	0.13	0.13
130	0.11	0.12	0.12	0.12	0.12	0.13
140	0.11	0.11	0.11	0.12	0.12	0.12
150	0.10	0.10	0.11	0.11	0.11	0.11
80 + 80	0.09	0.10	0.10	0.10	0.10	0.10
80 + 90**	0.09	0.09	0.10	0.10	0.10	0.10

* Calculations assume dense block infill of λ-value (1.13 W/mK)

** Where multiple layers of insulation of different thicknesses are used, the thickest layer should be installed as the outermost layer in the construction.

*** For the purposes of these U-value calculations the floor screed was entered at 65 mm and the concrete slab at 150 mm.

NB Refer to local distributor or Kingspan Insulation price list for current stock and non-stock sizes.

Suspended timber ground floors

Insulation between joists

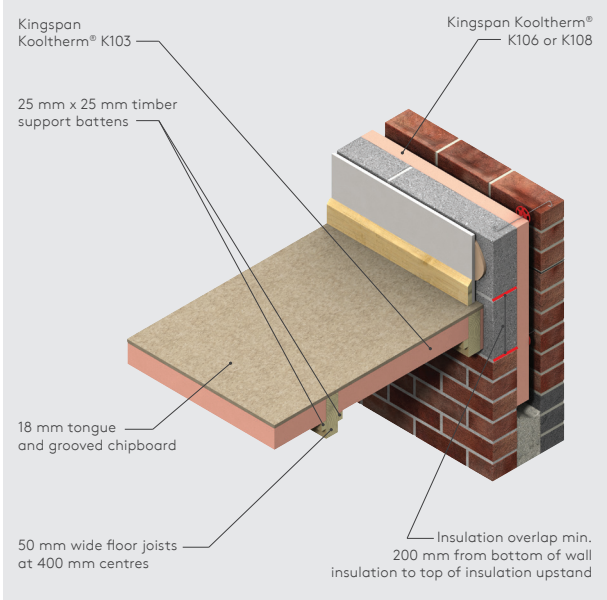


Figure 4

U-values (W/m²K) for various thicknesses of Kingspan Kooltherm® K103 and floor perimeter / area ratios						
Insulant thickness (mm)	Perimeter / area (m^{-1})					
	0.2	0.3	0.4	0.5	0.6	0.7
25	0.33	0.39	0.43	0.42	0.48	0.50
40	0.29	0.33	0.36	0.38	0.39	0.40
50	0.26	0.30	0.32	0.34	0.35	0.36
60	0.24	0.27	0.29	0.30	0.31	0.32
70	0.22	0.25	0.27	0.28	0.29	0.29
75	0.22	0.24	0.26	0.27	0.27	0.28
80	0.21	0.23	0.25	0.26	0.26	0.27
90	0.20	0.22	0.23	0.24	0.24	0.25
100	0.19	0.20	0.21	0.22	0.23	0.23
120	0.17	0.18	0.19	0.20	0.20	0.20
130	0.16	0.17	0.18	0.18	0.19	0.19
140	0.15	0.16	0.17	0.17	0.18	0.18
150	0.15	0.16	0.16	0.17	0.17	0.17
80 + 80	0.14	0.15	0.15	0.16	0.16	0.16
80 + 90*	0.13	0.14	0.15	0.15	0.15	0.16
75 + 100**	0.13	0.14	0.14	0.15	0.15	0.15

* Where multiple layers of insulation of different thicknesses are used, the thickest layer should be installed as the outermost layer in.

** Suspended timber ground floor joists are typically 200 mm deep and, therefore, U-values have been calculated with a maximum insulation thickness of 175 mm, in order to accommodate 25 x 25 mm timber support battens.

NB Refer to local distributor or Kingspan Insulation price list for current stock and non-stock sizes.

Typical constructions and U-values

Solid concrete ground based floors

Insulation below the floor slab

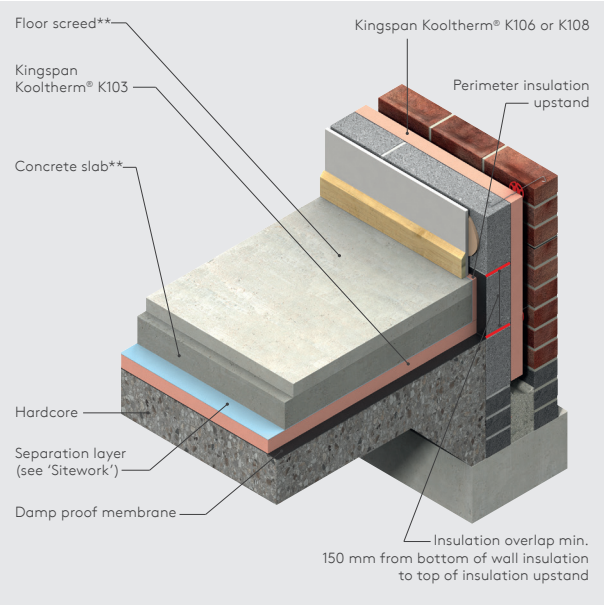


Figure 5

U-values (W/m²K) for various thicknesses of Kingspan Kooltherm® K103 and floor perimeter / area ratios						
Insulant thickness (mm)	Perimeter / area (m^{-1})					
	0.2	0.3	0.4	0.5	0.6	0.7
25	0.26	0.31	0.34	0.37	0.39	0.40
40	0.21	0.25	0.27	0.28	0.30	0.30
50	0.19	0.22	0.23	0.25	0.26	0.26
60	0.17	0.19	0.21	0.22	0.23	0.23
70	0.16	0.17	0.19	0.20	0.20	0.21
75	0.15	0.17	0.18	0.19	0.19	0.20
80	0.14	0.16	0.17	0.18	0.18	0.19
90	0.13	0.15	0.16	0.16	0.17	0.17
100	0.12	0.14	0.14	0.15	0.15	0.16
120	0.11	0.12	0.13	0.13	0.13	0.13
130	0.10	0.11	0.12	0.12	0.12	0.12
140	0.10	0.11	0.11	0.11	0.12	0.12
150	0.09	0.10	0.10	0.11	0.11	0.11
80 + 80	0.09	0.10	0.10	0.10	0.10	0.10
80 + 90*	0.09	0.09	0.09	0.09	0.10	0.10
75 + 100*	0.08	0.09	0.09	0.09	0.10	0.10

* Where multiple layers of insulation of different thicknesses are used, the thickest layer should be installed as the outermost layer in the construction.

** For the purposes of these U-value calculations the floor screed was entered at 65 mm and the concrete slab at 150 mm.

NB Refer to local distributor or Kingspan Insulation price list for current stock and non-stock sizes.

Insulation below the floor screed

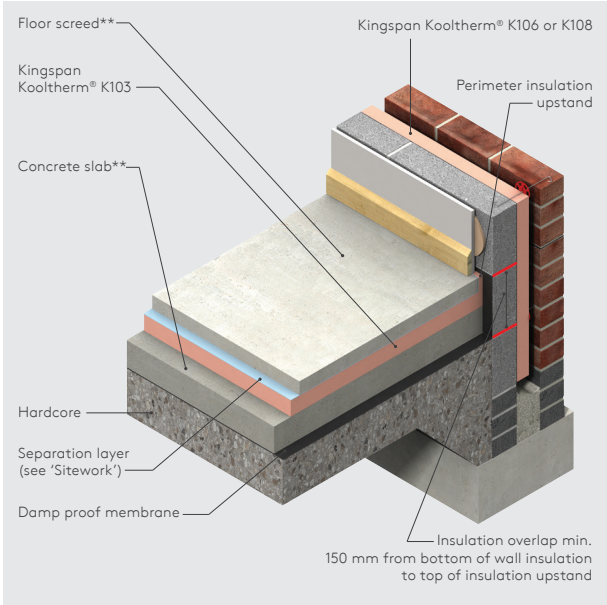


Figure 6

U-values (W/m²K) for various thicknesses of Kingspan Kooltherm® K103 and floor perimeter / area ratios						
Insulant thickness (mm)	Perimeter / area (m^{-1})					
	0.2	0.3	0.4	0.5	0.6	0.7
25	0.26	0.31	0.34	0.37	0.39	0.40
40	0.21	0.25	0.27	0.28	0.30	0.31
50	0.19	0.22	0.23	0.25	0.26	0.26
60	0.17	0.19	0.21	0.22	0.23	0.23
70	0.16	0.17	0.19	0.20	0.20	0.21
75	0.15	0.17	0.18	0.19	0.19	0.20
80	0.14	0.16	0.17	0.18	0.18	0.19
90	0.13	0.15	0.16	0.16	0.17	0.17
100	0.12	0.14	0.14	0.15	0.15	0.16
120	0.11	0.12	0.13	0.13	0.13	0.13
130	0.10	0.11	0.12	0.12	0.12	0.12
140	0.10	0.11	0.11	0.11	0.12	0.12
150	0.09	0.10	0.10	0.11	0.11	0.11
80 + 80	0.09	0.10	0.10	0.10	0.10	0.10
80 + 90*	0.09	0.09	0.09	0.10	0.10	0.10
75 + 100*	0.08	0.09	0.09	0.09	0.10	0.10

* Where multiple layers of insulation of different thicknesses are used, the thickest layer should be installed as the outermost layer in the construction.

** For the purposes of these U-value calculations the floor screed was entered at 65 mm and the concrete slab at 150 mm.

NB Refer to local distributor or Kingspan Insulation price list for current stock and non-stock sizes.

Design considerations

Heat loss and linear thermal bridging

Basic principles

Linear thermal bridging describes the heat losses that occur at junctions between elements, which is additional to the losses occurring through roofs, walls and floors. This heat loss is represented by the junction's psi (Ψ) value. The lower the Ψ-value, the better the performance of a junction detail. The Ψ-values and lengths of linear thermal bridges are accounted for in whole building energy and carbon dioxide emissions calculations.

In a typical wall-to-ground floor junction the heat will flow through the easiest path, for example in a masonry cavity wall the linear thermal bridge is primarily the inner leaf of masonry and in a timber frame wall the linear thermal bridge is primarily the sole plate and the construction below it. These linear thermal bridges can be reduced by increasing the distance that the heat has to travel.

Approved details, such as the Acceptable Construction Details (Republic of Ireland), can uplift performance to provide a clear starting point towards achieving compliance, but can be limited in scope and applicability. Where applicable, the principles in these details are also considered good practice for refurbishment. 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.

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

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

- For retrofit or refurbishment of existing buildings using Kingspan Kooltherm® K103, achieving continuity of insulation is the best approach to limiting losses through the wall / floor junctions. If continuity between floor and wall insulation layers cannot be achieved, overlap of insulation layers and use of lower conductivity materials represents a good practice approach. However, where neither option is possible, the risk of surface condensation at the coldest points will require particular consideration in determining an appropriate approach. Details and designs should be considered in the context of the property, its construction, characteristics, condition and ventilation provisions.
- For new build applications, care is also required to ensure continuation of insulation wherever possible between the wall and floor for best thermal performance. Where this is not possible, the insulation should be overlapped and ideally, lower conductivity material introduced between.

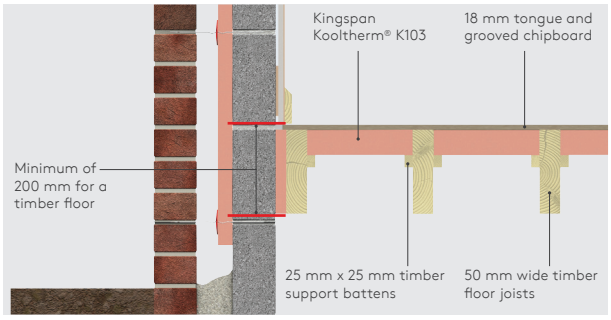


Figure 7: Complete timber floor insulation

- In order to minimise cold bridging at the edge of the floor, 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 (see Figures 1 & 2) for a concrete floor and 200 mm for a suspended timber floor (see Figure 9). The further down the wall insulation extends past the floor insulation, the better the thermal performance of the junction between the wall and the floor.
- Perimeter upstand insulation helps to reduce heat losses from the junction between the floor and external walls. The upstand insulation helps to increase the distance that the heat has to travel in order to escape through the junction, which therefore helps to reduce heat loss. Omitting this, or using a poorer performing insulation, can increase these losses.
- Using better thermally performing `lightweight' aggregate blockwork for the inner leaf of cavity walls in adjacency to the junction with the floor can assist with lowering heat losses from the junction.
- An internal lining of insulation on the warm side of the construction can help to reduce the heat losses through the junction. The internal lining could be a wall lining for the whole wall area, such as Kingspan Kooltherm® K118 Insulated Plasterboard, or could be localised insulation behind the plasterboard to help reduce a junction's losses (and losses from any timber soleplate).
- One of the best approaches to minimising cold bridging is to use external wall insulation, making the whole wall and any junctions warm, with suitable wall insulation at the junction with the ground floor extending past the level of the floor insulation below ground level.

For further advice on details to reduce linear thermal bridging please consult Kingspan Insulation's Technical Service Department (see rear cover).

For further information on thermal bridging, click here.

Design considerations

Environmental impact and responsible sourcing

Environmental Product Declaration

An Environmental Product Declaration (EPD), certified by BRE Global to the BRE Environmental Profiles 2013 Product Category Rules for Type III environmental product declaration of construction products to EN 15804: 2012 + A1: 2013 (Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products), has been created for the Kingspan Kooltherm® K110 PLUS insulation component produced at Kingspan Insulation's Pembridge, Herefordshire manufacturing facility.

Responsible sourcing

Kingspan Kooltherm® K103 produced at Kingspan Insulation's Pembridge, Herefordshire manufacturing facility is certified to BES 6001 (Framework Standard for the Responsible Sourcing of Construction Products) 'Good'.

BES 6001
Responsible Sourcing
www.greenbooklive.com

To download the EPD or certification please visit our **website**.

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® K103 should be described in specifications as:–

The floor insulation shall be Kingspan Kooltherm® K103 ____ mm thick: comprising a premium performance fibre-free rigid thermoset phenolic insulation core faced on both sides with a glass tissue based facing. The product shall have 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

E20/30, E20/200
K11/20, K11/25, K11/115, K11/125, K11/135, K11/145, K11/215, K11/225, K11/235, K11/245, K20/20, K21/120, K21/140
M10/40, M10/290, M13/40, M13/260
P10/45, P10/240, P10/250

Details also available at **the NBS Source**.

Building Information Modelling (BIM)

BIM objects for Kingspan Kooltherm® K103 can be downloaded using the Kingspan BIM Designer Software Tool available at **www.kingspaninsulation.co.uk/k103.**

Design standards

Consideration should be given to the recommendations of BS 8102: 2022 (Protection of below ground structures against water ingress. Code of practice), BS 8215: 1991 (Code of practice for design and installation of damp-proof courses in masonry construction) and the information given in Building Research Establishment Digest 104 (Floor Screeds).

Compressive loads

Un-reinforced floor screeds can be used in conjunction with Kingspan Kooltherm® K103 in most applications. The compressive strength of Kooltherm® K103 offers considerable advantages over some other floor insulants. Providing a compressive strength of 120 kPa allows greater floor loads to be considered and therefore additional scope in the use of Kooltherm® K103. However, where floor loads are to be excessive, consideration should be given to the use of Kingspan GreenGuard® which has greater compressive strength. For further information please contact the Kingspan Insulation Technical Service Department (see rear cover).

Substrate

Kingspan Kooltherm® K103 is not recommended for use in direct contact with subsoil and must be used over a DPM.

Lightning protection

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

Design considerations

Underfloor heating systems

The constructions shown in the 'Typical constructions and U-values' section can be readily converted to accommodate underfloor heating systems.

For a solid concrete floor, the position of the insulation is important in either exposing the thermal mass of the concrete floor to the heat provided by the system, or isolating the thermal mass from it.

For a 24 hour heating cycle, allowing the heat from the underfloor heating system to penetrate the concrete slab will provide a more even heating regime over a 24 hour period (Figure 8).

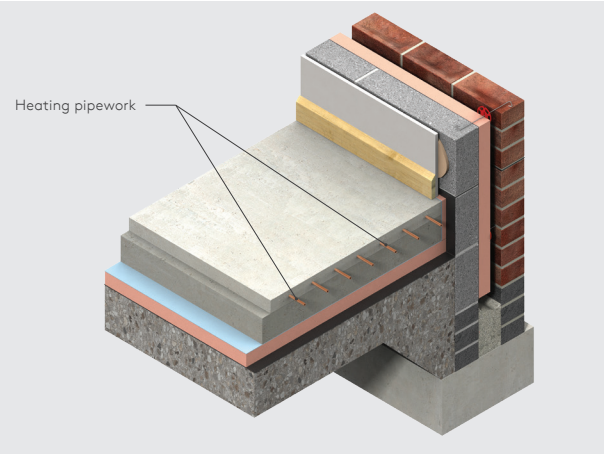


Figure 8: 24 Hour heating application - below the floor slab

For intermittent heating applications, where a fast response time is required, it is beneficial to have less thermal mass available to take up heat from the system and so placing the insulation layer below the screed but above the concrete slab (Figure 9) or beam and block floor (Figure 10) is the best solution.

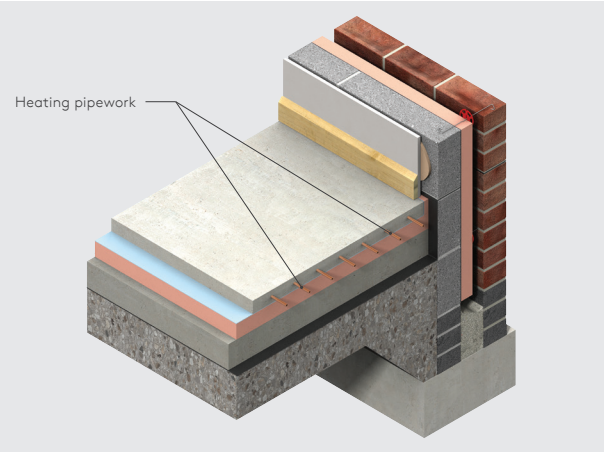


Figure 9: Intermittent heating applications - below the floor screed

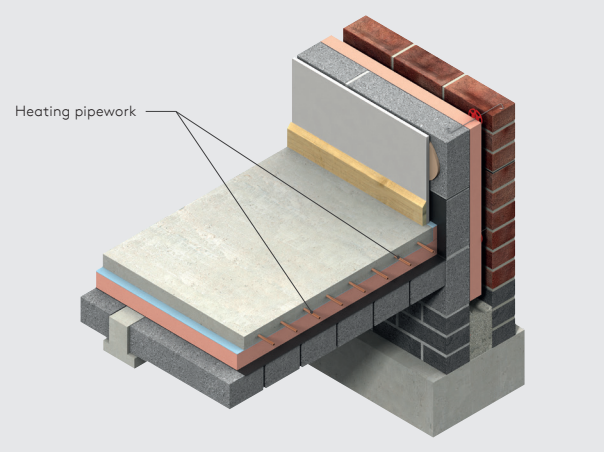


Figure 10: Intermittent heating applications - beam and block floor

Underfloor heating systems can also be accommodated in suspended timber floors. This arrangement has low thermal mass and so is more suited to intermittent heating applications (Figure 11).

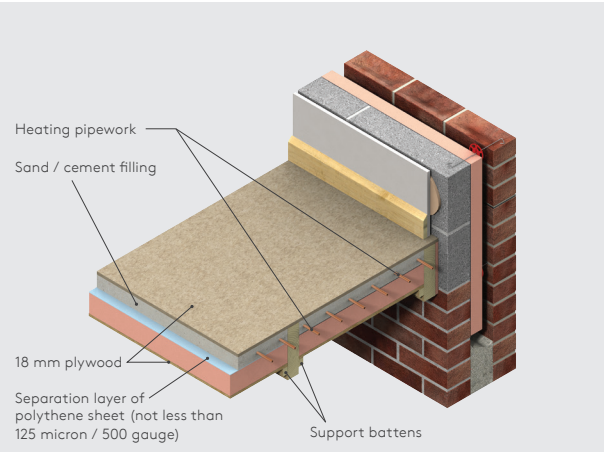


Figure 11: Intermittent heating applications - suspended timber floor

Sitework

Installation below a floor slab

- The site should be prepared and foundations, where appropriate, built to damp proof course (DPC) level.
- A thin sand blinding may be used to achieve a continuous level surface, free from projections, over rolled hardcore.
- The damp proof membrane (minimum 300 micron / 1200 gauge polythene) should be laid with joints well lapped and folded, to prevent the passage of ground water, over well compacted hardcore, prior to laying the insulation boards.
- The membrane should be brought up the surrounding foundation walls until it is sufficiently above the height of the wall DPC so that it will connect with or form the DPC.
- The insulation boards should always be loose-laid break-bonded, with joints lightly butted.
- If two layers of insulation are required, they should be horizontally offset relative to each other so that, as far as possible, the board joints in the two adjacent layers do not coincide with each other (see Figure 12).

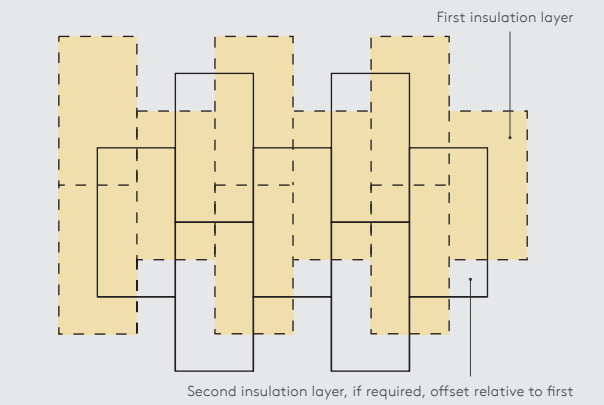


Figure 12: Offsetting of multiple insulation layers

- A strip of the insulation board (minimum 25 mm thick) should be placed vertically around the perimeter of the floor slab in order to prevent cold bridging. The top of the strip of insulation board should be level with the top of the floor screed and the bottom should be level with the bottom of the horizontal floor insulation, and be closely butted up to it.
- Insulation boards should be overlaid with a polythene sheet (not less than 125 micron / 500 gauge), to prevent the wet concrete penetrating the joints between the boards and to act as a vapour control layer. Ensure the polythene sheet has 150 mm overlaps, taped at the joints, and is turned up 100 mm at the walls.
- The subsequent installation of the concrete slab and screed or other flooring material is carried out in a manner similar to that for an un-insulated floor. The concrete slab and screed should be allowed to dry out prior to the installation of the floor finish.

Installation below a floor screed

- Concrete slabs should be allowed to dry out fully prior to the installation of the insulation boards (average 1 day per mm of slab thickness).
- The surface of the slab should be smooth, flat and free from projections. Beam and block floors should be level and grouted. Rough cast slabs should be levelled using a thin sand blinding to ensure boards are continuously supported.
- The damp proof membrane (minimum 300 micron / 1200 gauge polythene) should be laid with joints well lapped and folded, to prevent the passage of ground water, over the concrete floor slab, or beam and block floor prior to laying the insulation boards.
- The membrane should be brought up the surrounding foundation walls until it is sufficiently above the height of the wall DPC so that it will connect with or form the DPC.
- The insulation boards should always be loose-laid break-bonded, with joints lightly butted.
- If two layers of insulation are required, they should be horizontally offset relative to each other so that, as far as possible, the board joints in the two adjacent layers do not coincide with each other (see Figure 12).
- A strip of the insulation board (minimum 25 mm thick) should be placed vertically around the perimeter of the floor slab in order to prevent cold bridging. The top of the strip of insulation board should be level with the top of the floor screed and the bottom should be level with the bottom of the horizontal floor insulation, and closely butted up to it.
- Insulation boards should be overlaid with a polythene sheet (not less than 125 micron / 500 gauge), to prevent the wet screed penetrating the joints between the boards, and to act as a vapour control layer. Ensure the polythene sheet has 150 mm overlaps, taped at the joints, and is turned up 100 mm at the walls.
- Use sand and cement screed laid to a minimum thickness of 65 mm for domestic construction and 75 mm elsewhere.

Sitework

Installation in a suspended timber floor

Installation from above the floor joists

- The installation of Kingspan Kooltherm® K103 in suspended floor constructions should be carried out before commencement of floor boarding.
- In order to ensure insulation boards are flush with the top surface of the joists, they should be supported on minimum 25 mm x 25 mm treated softwood timber battens, proprietary galvanised steel saddle clips, or galvanised nails partially driven into the side of the joists.
- Battens / nails should be placed at an appropriate height to suit the thickness of board being fitted, and nails should remain 40 mm proud of the joist.
- The insulation boards should be cut to fit snugly between the floor joists and fitted so that they are supported by the battens / saddle clips or nails. Measure the distance between the joists prior to cutting the boards as spacings can vary.
- If two layers of insulation are required, they should be horizontally offset relative to each other so that, as far as possible, the board joints in the two adjacent layers do not coincide with each other.
- All board joints should be tightly butted.
- Ensure that insulation boards are fitted tightly between joists, and any gaps are filled with expanding urethane sealant.
- Any narrow gaps between a joist and perimeter wall should be insulated by specially cut pieces of board which in turn should be supported on blocks nailed to the underside of the joists. Gaps less than 25 mm wide should be filled with expanding urethane sealant.
- Kingspan Kooltherm® K103 is not suitable for installation directly over timber joists.

Installation from below the floor joists

- Floor boards should be fixed over joists prior to fitting Kingspan Kooltherm® K103 from below.
- The insulation boards should be cut to fit snugly between the floor joists. Measure the distance between the joists prior to cutting the boards as spacings can vary.
- Push the cut insulation boards between the joists so they are flush with the underside of the floor boards.
- If two layers of insulation are required, they should be horizontally offset relative to each other so that, as far as possible, the board joints in the two adjacent layers do not coincide with each other.
- All board joints should be tightly butted.
- Ensure that insulation boards are fitted tightly between joists, and any gaps are filled with expanding urethane sealant.
- Side-nail 25 mm x 25 mm timber battens to the joists or partially drive galvanised nails into the side of the joists in the appropriate position to hold the boards in place.
- Any narrow gaps between a joist and perimeter wall should be insulated by specially cut pieces of board which in turn should be supported on blocks nailed to the underside of the joists. Gaps less than 25 mm wide should be filled with expanding urethane sealant.

Wheeled / foot traffic

- Ensure boards are protected during installation from wheeled / foot traffic by using scaffold planks or other protective measures.

Underfloor heating systems

- Please refer to the instructions of the specific underfloor heating system manufacturer.

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® K103 is available through specialist insulation distributors and selected builders' merchants throughout the UK.

Packaging and 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 and 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**.

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

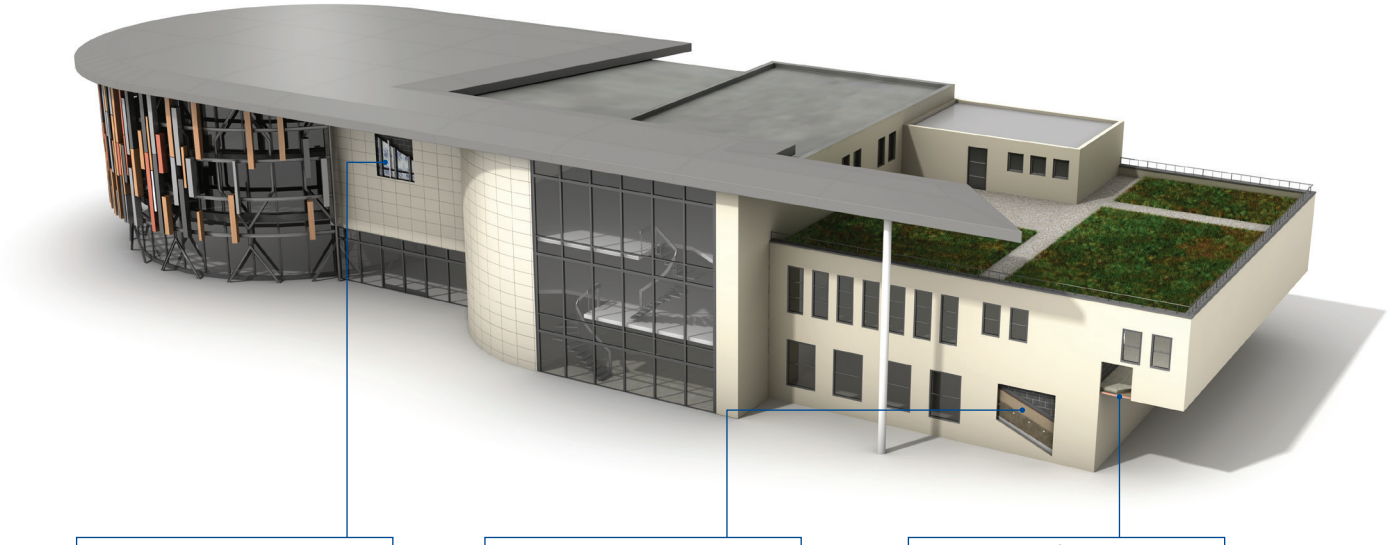
Products & solutions

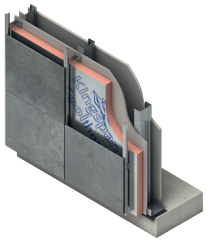
Rigid insulation products for building fabric applications, including roofs, walls and floors.

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

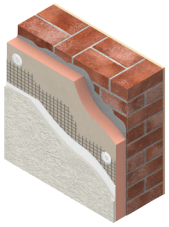
About Kingspan Insulation

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





Insulation for use behind rainscreen or masonry façade systems

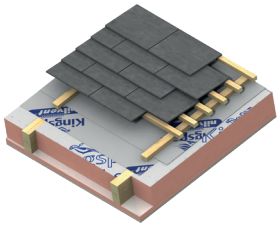


External insulation for masonry walls

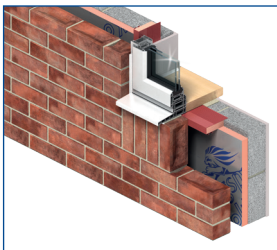
Insulation for structural ceilings (soffits)

About Kingspan Insulation

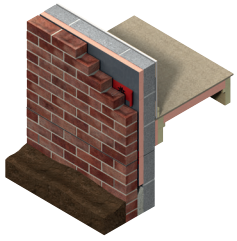
From new housing developments to refurbishing your home, we offer a number of different solutions for roof, wall and floor applications.



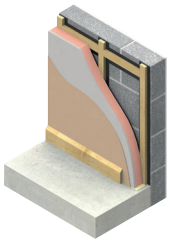
Insulation for tiled or slated pitched warm roof spaces



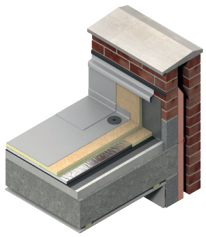
Insulated extrusions for closing wall cavities at openings



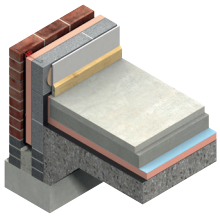
Full and partial fill cavity wall insulation



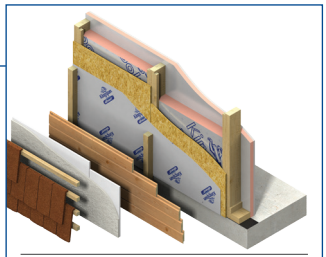
Insulation for tiled or slated pitched warm roof spaces



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

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

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